Chapter 1

Numbers

1. 0580_m24_qp_42 Q: 1

A grocer sells potatoes, mushrooms and carrots.

(a) A customer buys 3 kg of mushrooms at \$1.04 per kg and 4 kg of carrots at \$1.28 per kg.

Calculate the total cost.

\$ ..... [2]

(b) In one week, the ratio of the masses of vegetables sold by the grocer is

potatoes : mushrooms : carrots = 11 : 8 : 6.

(i) Work out the mass of mushrooms sold as a percentage of the total mass.

..... % [2]

(ii) The total mass of potatoes, mushrooms and carrots sold is 1500 kg.

Find the mass of carrots the grocer sells this week.

..... kg [2]

(iii) The profit the grocer makes selling 1 kg of carrots is \$0.75 .

Find the total profit the grocer makes selling carrots this week.

\$ ..... [1]

(iv) On the last day of the week, the grocer reduces the price of 1 kg of potatoes by 8% to \$1.15 .

Calculate the original price of 1 kg of potatoes.

\$ ..... [2]

(c) The grocer buys 620 kg of onions, correct to the nearest 20 kg.
He packs them into bags each containing 5 kg of onions, correct to the nearest 1 kg.

Calculate the upper bound for the number of bags of onions that he packs.

..... [3]

2. 0580_m24_qp_42 Q: 9

(a) Janna and Kamal each invest \$8000.
At the end of 12 years, they each have \$12 800.

(i) Janna invests in an account that pays simple interest at a rate of r% per year.

Calculate the value of r.

$r =$ ..... [3]

(ii) Kamal invests in an account that pays compound interest at a rate of R% per year.

Calculate the value of R.

$R =$ ..... [3]

(b) The population of a city is growing exponentially at a rate of 1.8% per year.
The population now is 260 000.

Find the number of complete years from now when the population will first be more than 300 000.

..... years [3]

3. 0580_s24_qp_41 Q: 1

(a) The table shows the areas, in km^2, of the four largest rainforests in the world.

Rainforest	Area (km^2)
Amazon	5 500 000
Congo	2 000 000
Atlantic	1 315 000
Valdivian	250 000

(i) Find the area of the Valdivian rainforest as a percentage of the area of the Amazon rainforest.

..... % [1]

(ii) Write, in its simplest form, the ratio of the areas of the rainforests Valdivian : Atlantic : Congo.

..... : ..... : ..... [2]

(iii) The Amazon rainforest has 60% of its area in Brazil and 10% of its area in Colombia.
$43\frac{1}{3}$% of the **remaining area** of the rainforest is in Peru.

Find the percentage of the Amazon rainforest that is in Brazil, Colombia and Peru.

..... % [3]

(iv) The area of the Amazon rainforest represents $\frac{27}{50}$ of the total area of rainforest in the world.

Calculate the total area of rainforest in the world.
Give your answer correct to the nearest 100 000 km^2.

..... km^2 [3]

(v) In the world, 60.7 hectares of rainforest are lost every minute.

Calculate the total area, in hectares, of rainforest that is lost in 365 days.
Give your answer in standard form.

..... hectares [3]

(b) The Amazon river has a length of 6440 km, correct to the nearest 10 km.
The Congo river has a length of 4400 km, correct to the nearest 100 km.

Calculate the upper bound of the difference between the lengths of the Amazon river and the Congo river.

..... km [3]

4. 0580_s24_qp_42 Q: 1

(a) A fruit drink is made using 1.5 litres of apple juice and 450 millilitres of mango juice.

Write the ratio apple juice : mango juice in its simplest form.

..... : ..... [2]

(b) One litre of fruit drink is shared between three cups.
The amount in the cups is in the ratio 9 : 6 : 10.

Calculate the number of millilitres in each cup.

..... ml , ... ml , ... ml [3]

(c) A shop buys bottles of the fruit drink for $3.20 each.
It sells them at a profit of 15%.

Calculate the selling price of each bottle of fruit drink.

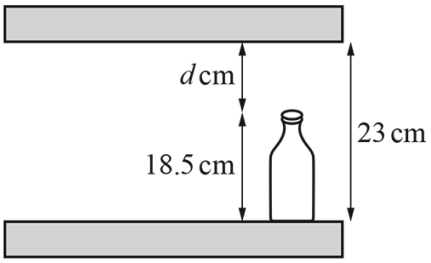
$ ..... [2]

(d) The number of bottles of fruit drink sold has grown exponentially at a constant rate of 2.5% per year.
5 years ago, the shop sold 16 620 bottles.

Calculate the number of bottles sold this year.

..... [2]

(e)



NOT TO SCALE

The bottles of juice are 18.5 cm tall, correct to the nearest millimetre.
They are stored on shelves.
The distance between the shelves is 23 cm, correct to the nearest centimetre.

Calculate the lower bound for the distance, d cm, between the top of a bottle and the shelf above it.

..... cm [3]

5. 0580_s24_qp_42 Q: 8

A baker decorates x small cakes and y large cakes.
In one day, he decorates:

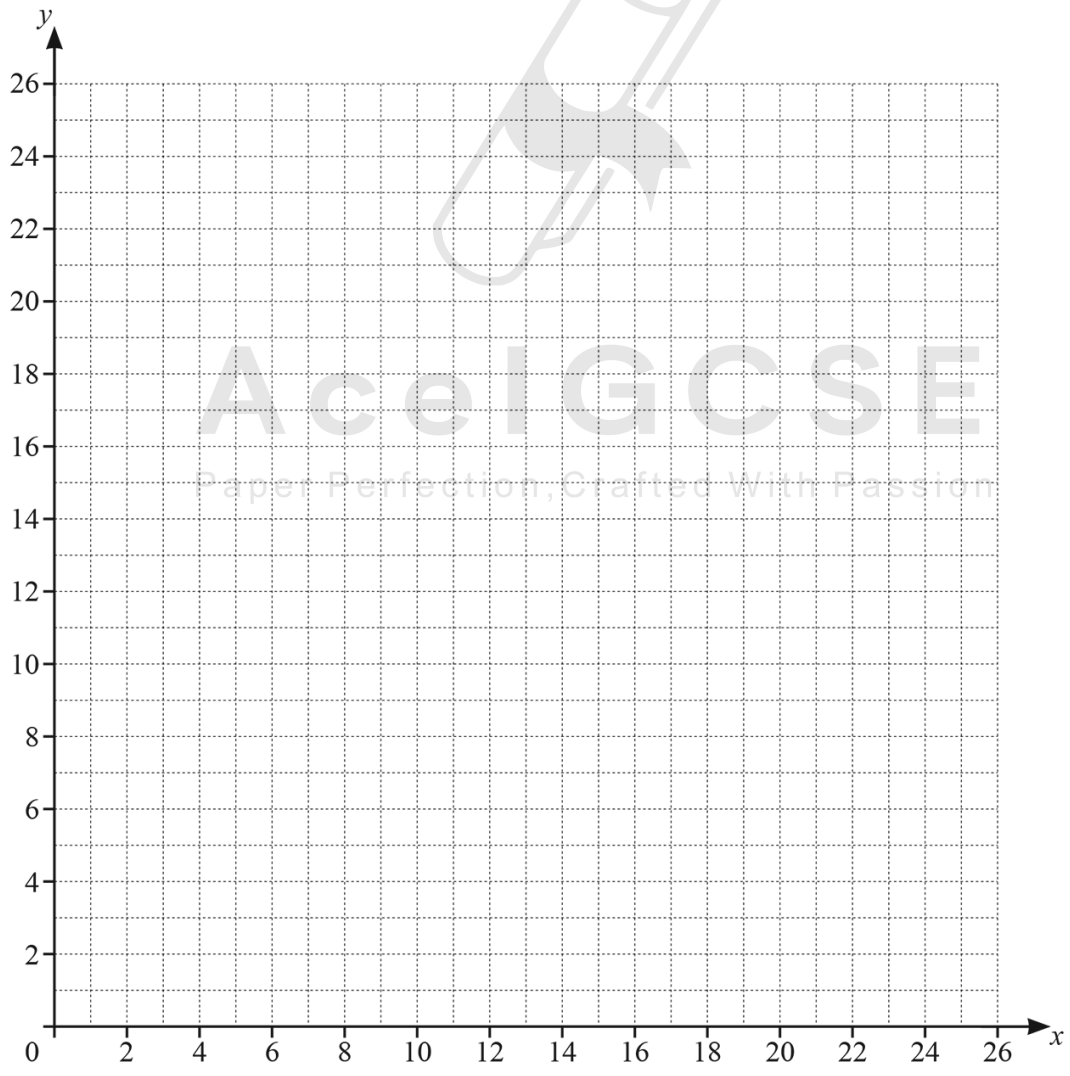
- not more than 16 small cakes
- less than 10 large cakes
- more small cakes than large cakes
- a total of not more than 24 cakes.

One of the inequalities that shows this information is $x \leqslant 16$.

(a) Write down the other three inequalities in x and/or y.

.... [3]

(b) On the grid, draw four straight lines and shade the unwanted regions to show these inequalities.
Label the region, R, which satisfies the four inequalities.



[6]

(c) The baker earns \$8 for decorating a small cake and \$12 for decorating a large cake.

Use your diagram to find the largest amount the baker can earn in one day by decorating cakes.

\$ ..... [2]

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6. 0580_s24_qp_43 Q: 1

(a) In 2023 a football club had 50 adult members and 70 child members.
The membership fee for an adult was $40 and the membership fee for a child was $15.

(i) Calculate the total of the membership fees received by the club in 2023.

$ ..... [2]

(ii) The cost of running the club in 2023 was $2780.

Calculate $2780 as a percentage of the total of the membership fees received by the club.

..... % [1]

(iii) In 2023 there were 120 members.
This was a decrease by 4% of the number of members in 2022.

Calculate the number of members in 2022.

..... [2]

(iv) In 2024 the total number of members increased from the 120 members in 2023.
The number of adult members and the number of child members each increased by the same number.
The ratio number of adult members : number of child members changed to 14 : 19.

(a) Find the total number of members in 2024.

..... [2]

(b) Calculate the percentage increase in the total number of members from 2023 to 2024.

..... % [2]

(b) The population of a village is 2500.
The population is decreasing exponentially at a rate of 3% per year.

(i) Calculate the population at the end of 3 years.

..... [2]

(ii) Find the number of complete years it takes for the population to first fall below 2000.

..... years [2]

7. 0580_s24_qp_43 Q: 7

(a) **(i)** A car travels 50 km at an average speed of 75 km/h.

Find the time taken.
Give your answer in minutes.

..... min [2]

(ii) Another car travels 47 km, correct to the nearest kilometre.
The average speed of this car is 75 km/h, correct to the nearest 5 km/h.

Calculate the lower bound of the time taken.
Give your answer in minutes.

..... min [3]

(b) A train travels a total of 240 km.
The train travels for t **minutes** at an average speed of 100 km/h.
It then travels for $(t+60)$ **minutes** at an average speed of 110 km/h.

Find the average speed for the whole journey.

..... km/h [6]

8. 0580_m23_qp_42 Q: 1

(a) (i) Alain and Beatrice share \$750 in the ratio Alain : Beatrice = 8 : 7.

Show that Alain receives \$400.

[1]

(ii) (a) Alain spends \$150.

Write \$150 as a percentage of \$400.

..... % [1]

(b) He invests the remaining \$250 at a rate of 2% per year simple interest.

Calculate the amount Alain has at the end of 5 years.

\$ ..... [3]

(iii) Beatrice invests her \$350 at a rate of 0.25% per **month** compound interest.

Calculate the amount Beatrice has at the end of 5 years.
Give your answer correct to the nearest dollar.

\$ ..... [3]

(b) Carl, Dina and Eva share 100 oranges.
The ratio Carl's oranges : Dina's oranges = 3 : 5.
The ratio Carl's oranges : Eva's oranges = 2 : 3.

Find the number of oranges Carl receives.

..... [2]

(c) Fred buys a house.
At the end of the first year, the value of the house increases by 5%.
At the end of the second year, the value of the house increases by 3% of its value at the end of the first year.
The value of Fred's house at the end of the second year is \$60 564.

Calculate how much Fred paid for the house.

\$ ..... [3]

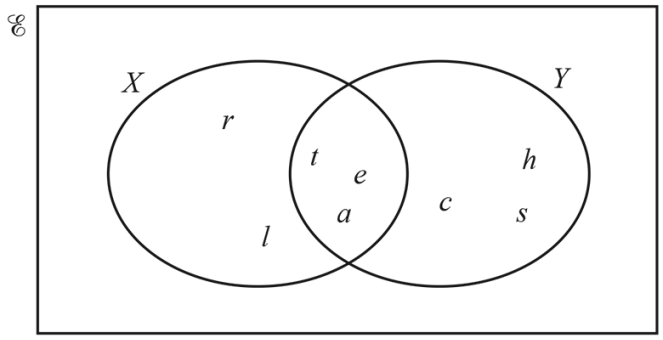
(d) Gabrielle invests \$500 at a rate of r% per year compound interest.
At the end of 8 years the value of Gabrielle's investment is \$609.20 .

Find the value of r.

$r =$ ..... [3]

9. 0580_s23_qp_41 Q: 9

(a) The Venn diagram shows set X and set Y.



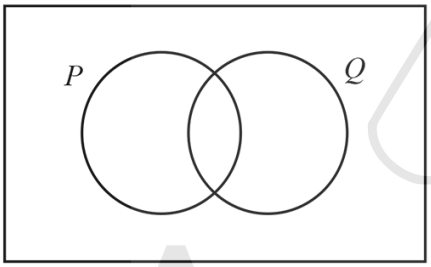
(i) List the elements of X.

..... [1]

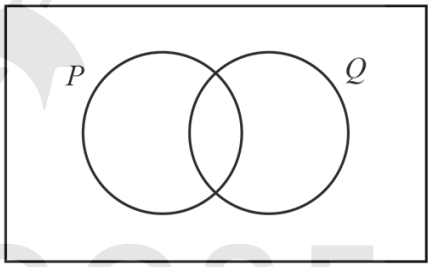
(ii) Find $n(Y')$.

..... [1]

(b) In each Venn diagram, shade the required region.



$P \cup Q$



$P' \cap Q$

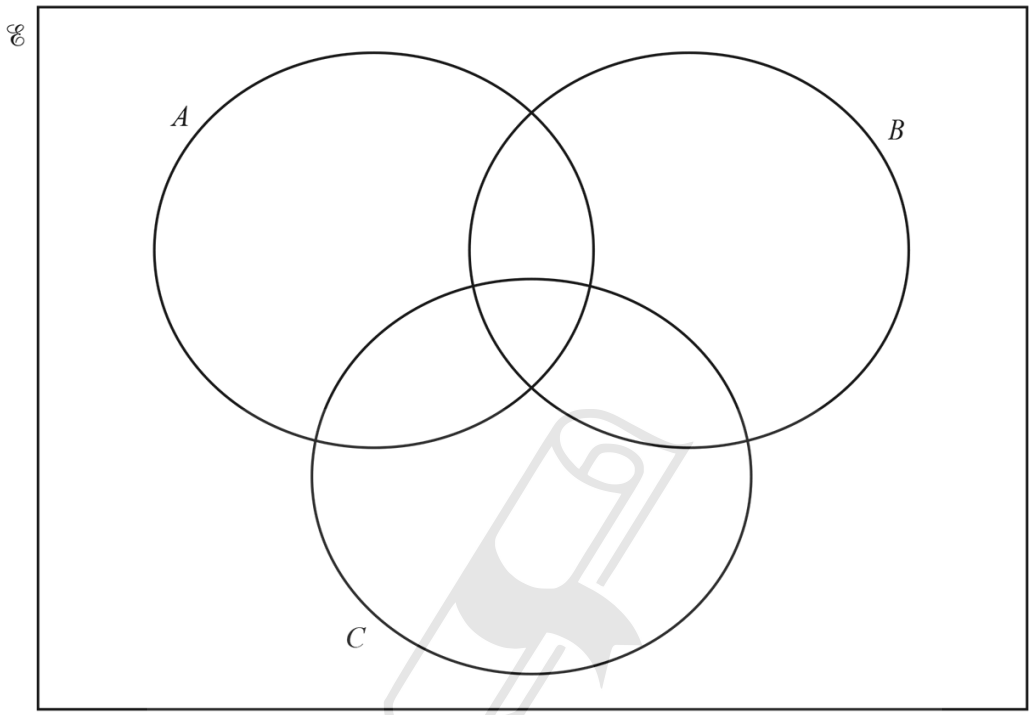
[2]

(c) $\mathscr{E} = \{\text{positive integers} < 13\}$

$A = \{x : x < 9\}$

$B = \{x : x \text{ is even}\}$

$C = \{x : x \text{ is a multiple of } 3\}$



(i) Complete the Venn diagram. [3]

(ii) Find $\text{n}(A' \cup (B \cap C))$.

..... [1]

10. 0580_s23_qp_42 Q: 2

(a) Anil changes \$830 into euros when the exchange rate is 1 euro = \$1.16 .
He spends 500 euros.
He then changes the remaining money back into dollars at the same exchange rate.

Work out how much, in dollars, Anil receives.

\$ ..... [3]

(b) In 2021, Anil earns \$37 000.

(i) He spends \$12 400 on bills in 2021.

Calculate the percentage of his earnings he spends on bills.

..... % [2]

(ii) His earnings of \$37 000 increase by 3.2% in 2022.

Calculate his earnings in 2022.

\$ ..... [2]

(c) Anil invests \$3500 in an account that pays a rate of 2.4% per year compound interest.

(i) Calculate the total interest earned at the end of 5 years.

\$ ..... [3]

(ii) Find the number of complete years before Anil has at least \$5000 in this account.

..... years [3]

11. 0580_s23_qp_43 Q: 1

(a) Tomas sells a computer, a bike and a phone.
The amounts he receives are in the ratio computer : bike : phone = 14 : 17 : 9.

(i) Calculate the amount he receives for the phone as a percentage of the total.

..... % [2]

(ii) The total amount he receives is $560.

Calculate how much he receives for the bike.

$ ..... [2]

(iii) Tomas originally bought the bike for $195.
He wanted to make a profit of at least 25% when he sold it.

Does Tomas make a profit of at least 25%?
You must show all your working to support your decision.

[3]

(b) Ulla invests $725 for 6 years in an account paying simple interest at a rate of 1.3% per year.

Calculate the total interest earned at the end of 6 years.

$ ..... [2]

(c) In a sale, all prices are reduced by 24%.
Victor pays $36.86 for a pair of shoes in the sale.

Calculate the original price of the shoes.

$ ..... [2]

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12. 0580_w23_qp_41 Q: 3

(a) The table shows information about some of the planets in the solar system.

Planet	Diameter (km)	Average distance from the Sun (km)
Earth	12 800	1.496×10^8
Mars	6 800	2.279×10^8
Jupiter	143 000	7.786×10^8
Saturn	120 500	1.434×10^9
Neptune	49 500	4.495×10^9

(i) The average distance of Mars from the Sun is 2.279×10^8 km.

Write this distance as an ordinary number.

..... km [1]

(ii) The planet Uranus has a diameter that is 35.8% of the diameter of Jupiter.

Calculate the diameter of Uranus.

..... km [2]

(iii) The ratio diameter of Neptune : diameter of Saturn can be written in the form 1 : n.

Find the value of n.

$n =$ ..... [1]

(iv) Find the average distance of Neptune from the Sun as a percentage of the average distance of the Earth from the Sun.

..... % [2]

(v) Distances within the solar system are also measured in astronomical units (AU).
The average distance of Jupiter from the Sun is 5.20 AU.

Calculate the average distance of Mars from the Sun in astronomical units.

..... AU [2]

(vi) The diameter of Mars is 39.2% greater than the diameter of Mercury.

Calculate the diameter of Mercury.

..... km [2]

(b) One light year is the distance that light travels in a year of 365.25 days.
The speed of light is 2.9979×10^5 kilometres per second.

(i) Show that one light year is 9.461×10^{12} km, correct to 4 significant figures.

[2]

(ii) The distance from the Andromeda Galaxy to Earth is 2.40×10^{19} km.

Calculate the time taken for light to travel from this galaxy to Earth.
Give your answer in millions of years.

..... million years [2]

13. 0580_w23_qp_42 Q: 3

(a) The value of Priya's car decreases by 10% every year.
The value today is $7695.

(i) Calculate the value of the car after one year.

$ ..... [2]

(ii) Calculate the value of the car one year ago.

$ ..... [2]

(b) Ali invests $600 at a rate of 2% per year simple interest.

Calculate the value of Ali's investment at the end of 5 years.

$ ..... [3]

(c) Sara invests $500 at a rate of r% per year compound interest.
At the end of 12 years, the value of Sara's investment is $601.35, correct to the nearest cent.

Find the value of r.

r = ... [3]

(d) The mass of a radioactive substance decreases exponentially at a rate of 3% each day.

(i) Find the overall percentage decrease at the end of 10 days.

..... % [2]

(ii) Find the number of whole days it takes until the mass of this substance is one half of its original amount.

..... [3]

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14. 0580_w23_qp_43 Q: 1

The table shows the amount received when exchanging **$100** in some countries.

Country	Amount received for $100
Wales	77.05 pounds
India	7437.05 rupees
China	671.20 yuan
Spain	85.35 euros

(a) Brad changes $250 to Indian rupees.

Calculate the amount he receives correct to the nearest rupee.

..... rupees [2]

(b) Wang changes 5400 Chinese yuan into dollars.

Calculate how much he receives in dollars, correct to the nearest cent.

$ ..... [2]

(c) Gretal lives in Spain and goes on holiday to Wales.
She spends 3500 euros in total on travel and hotels in the ratio

travel : hotels = 4 : 3.

(i) Work out how much Gretal spends, in euros, on travel.

..... euros [2]

(ii) Work out how much she spends, **in pounds**, on hotels.

..... pounds [3]

(iii) Gretal flies home to Spain.
The plane flies a distance of 2200 km, correct to the nearest 100 km.
The average speed of the plane is 740 km/h, correct to the nearest 20 km/h.

Calculate the lower bound of the time taken, in hours and minutes, for this flight.

..... h ..... min [3]

15. 0580_m22_qp_42 Q: 1

A company employed 300 workers when it started and now employs 852 workers.

(a) Calculate the percentage increase in the number of workers.

..... % [2]

(b) Of the 852 workers, the ratio part-time workers : full-time workers = 5 : 7.

Calculate the number of full-time workers.

..... [2]

(c) The company makes 40 600 headphones in one year.

Write this number

(i) in words,

..... [1]

(ii) in standard form.

..... [1]

(d) In one month, the company sells 3 000 headphones.
Of these, 48% are exported, $\frac{3}{8}$ are sold to shops and the rest are sold online.

Calculate the number of headphones that are sold online.

..... [3]

(e) One year, sales increased by 15%.
The following year sales increased by 18%.

Calculate the overall percentage increase in sales.

..... % [3]

16. 0580_s22_qp_41 Q: 2

(a) Alex, Bobbie and Chris share strawberries in the ratio Alex : Bobbie : Chris = 3 : 2 : 2.
Chris receives 12 strawberries.

Calculate the total number of strawberries shared.

..... [2]

(b) In a sale, a shop reduces all prices by 12%.

(i) Dina buys a book which has an original price of $6.50 .

Calculate how much Dina pays for the book.

$ ..... [2]

(ii) Elu pays $11 for a toy.

Calculate the original price of the toy.

$ ..... [2]

(c) Feri invests some money.
The rate of interest for the first year is 2.5%.
At the end of the second year the overall percentage increase of Feri's investment is 6.6%.

Find the rate of interest for the second year.

..... % [2]

(d) A radioactive substance decays at an exponential rate of 2% per day.
The initial mass is 80 g.

(i) Find the mass at the end of 5 days.

..... g [2]

(ii) Find how many **more** whole days, after day 5, it takes for the mass to reduce to less than 67 g.

..... [3]

17. 0580_s22_qp_42 Q: 1

(a) Find the lowest common multiple (LCM) of 30 and 75.

..... [2]

(b) Share \$608 in the ratio 4 : 5 : 7.

\$ .....

\$ .....

\$ ..... [3]

(c) Work out $\frac{6.39 \times 10^4}{2.45 \times 10^6}$.

Give your answer in standard form.

..... [2]

(d) Write $0.\dot{2}\dot{7}$ as a fraction.

..... [1]

(e) A stone has volume $45\,cm^3$ and mass 126 g.
Find the density of the stone, giving the units of your answer.

[Density = mass ÷ volume]

..... [2]

18. 0580_s22_qp_43 Q: 1

Here is part of a bus timetable.

Abbots	06 50	08 25	09 20
Callet	07 12	08 47	09 42
North Moor	07 30	09 05	10 00
South Moor	07 37	09 12	10 07
Centre Point	08 00	09 35	10 30

(a) Rashid catches the 09 20 bus at Abbots.

Find the time the bus arrives at South Moor.

..... [1]

(b) Annisa leaves home at 8.27 am and takes 25 minutes to walk to the bus stop at Callet.
She catches the next bus to Centre Point.

Find the total time, in minutes, for her journey from leaving home to arriving at Centre Point.

..... min [2]

(c) The distance from Abbots to Centre Point is 29.4 km.
Each bus takes the same time for the journey.

Calculate the average speed of a bus for this journey.
Give your answer in kilometres per hour.

..... km/h [2]

(d) On one journey, all 56 seats on the bus are filled.
The ratio of adults to children on this journey is adults : children = 5 : 3.
The cost for an adult ticket is $2.80 .
The cost for a child ticket is $\frac{3}{4}$ of the adult cost.

Work out the total cost of the tickets for this journey.

$ ..... [4]

19. 0580_w22_qp_41 Q: 2

(a) Write

(i) 2994.99 correct to the nearest 10,

..... [1]

(ii) 0.983 correct to 1 decimal place,

..... [1]

(iii) 2090 correct to 2 significant figures.

..... [1]

(b) Write down a prime number between 90 and 100.

..... [1]

(c) Write 2^{-6} as a fraction.

..... [1]

(d) Write 0.007 01 in standard form.

..... [1]

(e) Simplify $1.5 \times 10^{x} + 1.5 \times 10^{x-1}$ giving your answer in standard form.

..... [2]

(f) Write $0.3\dot{7}$ as a fraction.
You must show all your working.

..... [2]

20. 0580_w22_qp_41 Q: 4

(a) (i) Zak invests $500 at a rate of 2% per year simple interest.

Calculate the value of Zak's investment at the end of 5 years.

$ ..... [3]

(ii) Yasmin invests $500 at a rate of 1.8% per year compound interest.

Calculate the value of Yasmin's investment at the end of 5 years.

$ ..... [2]

(iii) Zak and Yasmin continue with these investments.

How many **more complete** years is it before the value of Yasmin's investment is greater than the value of Zak's investment?

..... [3]

(b) Xavier buys a car for \$2500.
The value of the car decreases exponentially at a rate of 10% each year.

Calculate the value of Xavier's car at the end of 5 years.
Give your answer correct to the nearest dollar.

\$ ..... [3]

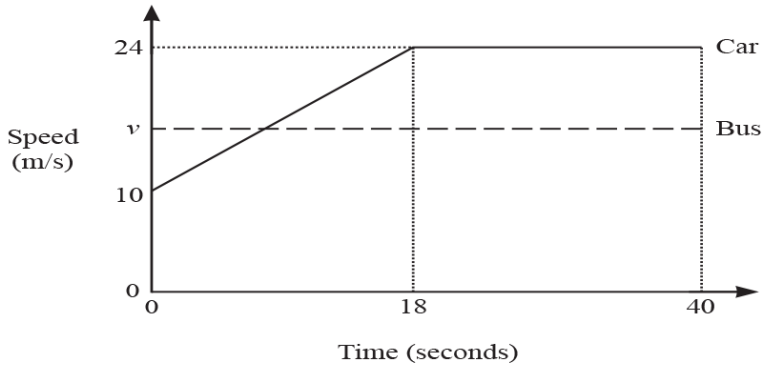
(c) The number of a certain type of bacteria increases exponentially at a rate of r% each day.
After 22 days, the number of this bacteria has doubled.

Find the value of r.

r = ... [3]

21. 0580_w22_qp_42 Q: 5

(a) The diagram shows the speed–time graph for part of a journey for two vehicles, a car and a bus.



(i) Calculate the acceleration of the car during the first 18 seconds.

..... m/s^2 [1]

(ii) In the first 40 seconds the car travelled 134 m more than the bus.

Calculate the constant speed, v, of the bus.

v = ... m/s [4]

(b) A train takes 10 minutes 30 seconds to travel 16 240 m.

Calculate the average speed of the train.
Give your answer in kilometres per hour.

..... km/h [3]

22. 0580_w22_qp_43 Q: 1

(a) Here are the ingredients needed to make a pasta bake to serve 12 people.

250 g butter
600 g pasta
460 g mushrooms
280 g cheese
800 ml milk

(i) Find the mass of the cheese as a percentage of the mass of the mushrooms.

..... % [1]

(ii) Find the mass of butter needed to make a pasta bake to serve 18 people.

..... g [2]

(iii) Monica has 2.2 litres of milk and 1.5 kg of each other ingredient.

Calculate the greatest number of people she can serve with pasta bake.

..... [3]

(b) In 2019, a packet of pasta cost \$2.40 .
This was an increase of 25% of the cost of a packet in 2018.

(i) Work out the cost in 2018.

\$ ..... [2]

(ii) In 2020, the cost of a packet increased by 15% from the cost in 2019.

Work out the total percentage increase in the cost of a packet from 2018 to 2020.

..... % [3]

(c)

Pasta is sold in packets with width 11.5 cm, correct to the nearest 0.5 cm.
A shop places these packets in a single line on a shelf of length 2 m, correct to the nearest 0.1 m.

Find the maximum number of these packets that will fit along this shelf.
You must show all your working.

..... [3]

23. 0580_m21_qp_42 Q: 1

Painter	Plumber	Electrician
$35 per hour	Fixed charge $40 plus $26.50 per hour	$48 per hour for the first 2 hours then $32 per hour

These are the rates charged by a painter, a plumber and an electrician who do some work for Mr Sharma.

(a) The painter works for 7 hours.

Calculate the amount Mr Sharma pays the painter.

$ ..... [1]

(b) Mr Sharma pays the plumber $252.

Calculate how many hours the plumber works.

..... hours [2]

(c) Mr Sharma pays the electrician $224.

Calculate how many hours the electrician works.

..... hours [2]

(d) Write down the ratio of the amount Mr Sharma pays to the painter, the plumber and the electrician.
Give your answer in its lowest terms.

painter : plumber : electrician = ... : ..... : ..... [2]

24. 0580_m21_qp_42 Q: 10

(a) A box is a cuboid with length 45 cm, width 30 cm and height 42 cm.
The box is completely filled with 90.72 kg of sand.

Calculate the density of this sand in kg/m^3.
[Density = mass ÷ volume]

..... kg/m^3 [3]

(b) A bag contains 15000 cm^3 of sand.
Some of this sand is used to completely fill a hole in the shape of a cylinder.
The hole is 30 cm deep and has radius 10 cm.

Calculate the percentage of the sand from the bag that is used.

..... % [3]

(c) Sand costs $98.90 per tonne.
This cost includes a tax of 15%.

Calculate the amount of tax paid per tonne of sand.

$ ..... [3]

(d) Raj buys some sand for 3540 rupees.

Calculate the cost in dollars when the exchange rate is $1 = 70.8 rupees.

$ ..... [2]

25. 0580_s21_qp_41 Q: 1

(a) The total cost of a taxi journey is calculated as

- \$0.50 per kilometre

plus

- \$0.40 per minute.

(i) Calculate the total cost of a journey of 32 km that takes 30 minutes.

\$ ..... [2]

(ii) The total cost of a journey of 100 km is \$98.

Show that the time taken is 2 hours.

[3]

(b) Three taxi drivers travel a total of 8190 km in the ratio 5 : 2 : 7.

Calculate the distance each driver travels.

Driver 1 ..... km

Driver 2 ..... km

Driver 3 ..... km [3]

(c) After midnight, the cost of any taxi journey increases by 45%.
One journey costs \$84.10 after midnight.

Calculate the cost of the same journey before midnight.

\$ ..... [2]

26. 0580_s21_qp_41 Q: 4

(a) The exchange rate is 1 euro = \$1.142 .

(i) Johann changes \$500 into euros.

Calculate the number of euros Johann receives.
Give your answer correct to the nearest euro.

..... euros [2]

(ii) Johann buys a computer for \$329.
The same computer costs 275 euros.

Calculate the difference in cost in dollars.

\$ ..... [2]

(b) Lucy spends $\frac{3}{8}$ of the money she has saved this month on a book that costs \$5.25 .

Calculate how much money Lucy has saved this month.

\$ ..... [2]

(c) Kamal invests \$6130 at a rate of r% per year compound interest.
The value of his investment at the end of 5 years is \$6669.

Calculate the value of r.

r = ... [3]

27. 0580_s21_qp_42 Q: 1

(a) A 2.5-litre tin of paint costs \$13.50 .
In a sale, the cost is reduced by 14%.

(i) Work out the sale price of this tin of paint.

\$ ..... [2]

(ii) Work out the cost of buying 42.5 litres of paint at this sale price.

\$ ..... [2]

(b) Henri buys some paint in the ratio red paint : white paint : green paint = 2 : 8 : 5.

(i) Find the percentage of this paint that is white.

..... % [1]

(ii) Henri buys a total of 22.5 litres of paint.

Find the number of litres of green paint he buys.

..... litres [2]

(c) Maria paints a rectangular wall.
The length of the wall is 20.5 m and the height is 2.4 m, both correct to 1 decimal place.

One litre of paint covers an area of exactly $10\,m^2$.

Calculate the smallest number of 2.5-litre tins of paint she will need to be sure all the wall is painted.
Show all your working.

..... [4]

28. 0580_s21_qp_43 Q: 1

(a) (i) Yasmin and Zak share an amount of money in the ratio 21 : 19.
Yasmin receives $6 more than Zak.

Calculate the total amount of money shared by Yasmin and Zak.

$ ..... [2]

(ii) In a sale, all prices are reduced by 15%.

(a) Yasmin buys a blouse with an original price of $40.

Calculate the sale price of the blouse.

$ ..... [2]

(b) Zak buys a shirt with a sale price of $29.75 .

Calculate the original price of the shirt.

$ ..... [2]

(b) Xavier's salary increases by 2% each year.
In 2010, his salary was \$40 100.

(i) Calculate his salary in 2015.
Give your answer correct to the nearest dollar.

\$ ..... [3]

(ii) In which year is Xavier's salary first greater than \$47 500?

..... [3]

(c) In January 2020, the population of a town was 5% **more** than its population in January 2018.
In January 2021, the population of this town was 2% **less** than its population in January 2020.

Calculate the overall percentage increase in the population from January 2018 to January 2021.

..... % [2]

29. 0580_m20_qp_42 Q: 1

Dhanu has a model railway.

(a) He has a train that consists of a locomotive and 4 coaches.
The mass of the locomotive is 87 g and the mass of each coach is 52 g.

(i) Work out the total mass of the train.

..... g [2]

(ii) Work out the mass of the locomotive as a percentage of the total mass of the train.

..... % [1]

(b) The train is 61 cm long and travels at a speed of 18 cm/s.
It takes 4 seconds for the whole of the train to cross a bridge.

Calculate the length of the bridge.

..... cm [2]

(c) A new locomotive costs $64.

Calculate the cost of the locomotive in rupees when the exchange rate is 1 rupee = $0.0154 .
Give your answer correct to the nearest 10 rupees.

..... rupees [2]

(d) The cost of a railway magazine increases by 12.5% to \$2.70 .

Calculate the cost of the magazine before this increase.

\$ ..... [2]

(e) Dhanu plays with his model railway from 06 50 to 11 15.
He then rides his bicycle for 3 hours.

Find the ratio time playing with model railway : time riding bicycle.
Give your answer in its simplest form.

..... : ..... [3]

(f) The value of Dhanu's model railway is \$550.
This value increases exponentially at a rate of r% per year.
At the end of 5 years the value will be \$736.

Calculate the value of r.

r = ... [3]

30. 0580_p20_qp_40 Q: 1

(a) Kristian and Stephanie share some money in the ratio 3 : 2.
Kristian receives $72.

(i) Work out how much Stephanie receives.

$ ..... [2]

(ii) Kristian spends 45% of his $72 on a computer game.

Calculate the price of the computer game.

$ ..... [1]

(iii) Kristian also buys a meal for $8.40 .

Calculate the fraction of the $72 Kristian has left after buying the computer game and the meal.
Give your answer in its lowest terms.

..... [2]

(iv) Stephanie buys a book in a sale for $19.20 .
This sale price is after a reduction of 20%.

Calculate the original price of the book.

$ ..... [3]

(b) Boris invests \$550 at a rate of 2% per year simple interest.

Calculate the value of the investment at the end of 10 years.

\$ ..... [3]

(c) Marlene invests \$550 at a rate of 1.9% per year compound interest.

Calculate the value of the investment at the end of 10 years.

\$ ..... [2]

(d) Hans invests \$550 at a rate of x% per year compound interest.
At the end of 10 years, the value of the investment is \$638.30, correct to the nearest cent.

Find the value of x.

$x =$ ..... [3]

31. 0580_s20_qp_41 Q: 1

(a) In 2018, Gretal earned $32 000.

(i) She paid tax of 24% on these earnings.

Work out the amount she paid in tax in 2018.

$ ..... [2]

(ii) In 2019, Gretal's earnings increased by 7%.

Work out her earnings in 2019.

$ ..... [2]

(b) Gretal invests $5000 at a rate of 2% per year compound interest.

Calculate the value of her investment at the end of 3 years.

$ ..... [2]

(c) One month, Gretal spent a total of $360 on presents.
She spent $\frac{1}{5}$ of this total on presents for her parents.
She spent $\frac{2}{3}$ of the remaining money on presents for her friends.
She spent the rest of the money on presents for her sisters.

Calculate the percentage of the $360 that she spent on presents for her sisters.

..... % [4]

(d) Arjun earned \$36 515 in 2019.
This was an increase of 9% on his earnings in 2018.

Work out his earnings in 2018.

\$ ..... [2]

(e) Arjun and Gretal each pay rent.

In 2018, the ratio of the amount each paid in rent was Arjun : Gretal = 5 : 7.
In 2019, the ratio of the amount each paid in rent was Arjun : Gretal = 9 : 13.

Arjun paid the same amount of rent in both 2018 and 2019.
Gretal paid \$290 more rent in 2019 than she did in 2018.

Work out the amount Arjun paid in rent in 2019.

\$ ..... [4]

32. 0580_s20_qp_41 Q: 5

x is an integer.

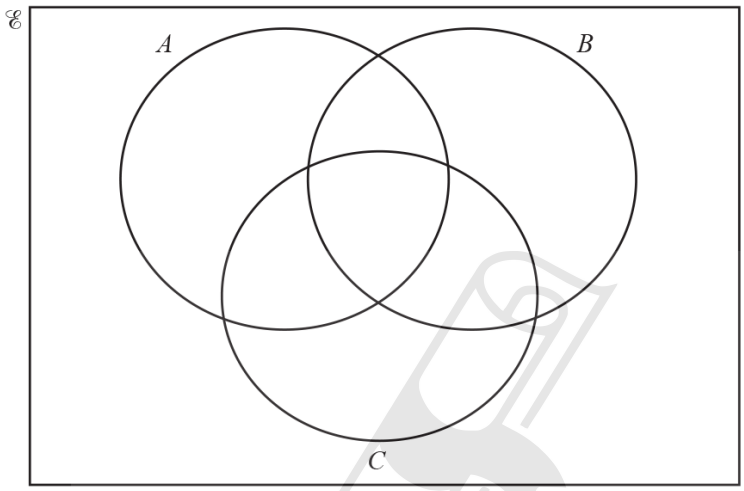
$\mathscr{E} = \{x : 41 \leqslant x \leqslant 50\}$

$A = \{x : x \text{ is an odd number}\}$

$B = \{x : x \text{ is a multiple of } 3\}$

$C = \{x : x \text{ is a prime number}\}$

(a) Complete the Venn diagram to show this information.



[3]

(b) List the elements of

(i) $A \cap C$,

..... [1]

(ii) $(B \cup C)'$.

..... [1]

(c) Find $n(A \cap B \cap C)$.

..... [1]

33. 0580_s20_qp_42 Q: 1

(a) **(i)** Divide \$24 in the ratio 7 : 5.

\$ ..... , \$ ..... [2]

(ii) Write \$24.60 as a fraction of \$2870.
Give your answer in its lowest terms.

..... [2]

(iii) Write \$1.92 as a percentage of \$1.60 .

..... % [1]

(b) In a sale the original prices are reduced by 15%.

(i) Calculate the sale price of a book that has an original price of \$12.

\$ ..... [2]

(ii) Calculate the original price of a jacket that has a sale price of \$38.25 .

\$ ..... [2]

(c) (i) Dean invests \$500 for 10 years at a rate of 1.7% per year simple interest.

Calculate the total interest earned during the 10 years.

\$ ..... [2]

(ii) Ollie invests \$200 at a rate of 0.0035% **per day** compound interest.

Calculate the value of Ollie's investment at the end of 1 year.
[1 year = 365 days.]

\$ ..... [2]

(iii) Edna invests \$500 at a rate of r% per year compound interest.
At the end of 6 years, the value of Edna's investment is \$559.78 .

Find the value of r.

r = ... [3]

34. 0580_s20_qp_43 Q: 1

(a)

Campsite fees (per day)	
Tent	$15.00
Caravan	$25.00

The sign shows the fees charged at a campsite.
Today there are 54 tents and 18 caravans on the site.

Calculate the fees charged today.

$ ..... [2]

(b) In September the total income at the campsite was $37 054.
This was a decrease of 4.5% on the total income in August.

Calculate the total income in August.

$ ..... [2]

(c) The visitors to the campsite today are in the ratio

men : women = 5 : 4 and women : children = 3 : 7.

(i) Calculate the ratio men : women : children in its simplest form.

..... : ..... : ..... [2]

(ii) Today there are 224 children at the campsite.

Calculate the total number of men and women.

..... [3]

(d) The space allowed for each tent is a rectangle measuring 8 m by 6 m, each correct to the nearest metre.

Calculate the upper bound for the area of the space allowed for each tent.

..... m^2 [2]

(e) The value of the campsite has increased exponentially by 1.5% every year since it opened 30 years ago.

Calculate the value of the campsite now as a percentage of its value 30 years ago.

..... % [2]

35. 0580_w20_qp_41 Q: 2

(a) A plane has 14 First Class seats, 70 Premium seats and 168 Economy seats.

Find the ratio First Class seats : Premium seats : Economy seats.
Give your answer in its simplest form.

..... : ..... : ..... [2]

(b) **(i)** For a morning flight, the costs of tickets are in the ratio

First Class : Premium : Economy = 14 : 6 : 5.

The cost of a Premium ticket is $114.

Calculate the cost of a First Class ticket and the cost of an Economy ticket.

First Class $ .....

Economy $ ..... [3]

(ii) For an afternoon flight, the cost of a Premium ticket is reduced from $114 to $96.90 .

Calculate the percentage reduction in the cost of a ticket.

..... % [2]

(c) When the local time in Athens is 09 00, the local time in Berlin is 08 00.
A plane leaves Athens at 13 15.
It arrives in Berlin at 15 05 local time.

(i) Find the flight time from Athens to Berlin.

..... h ..... min [1]

(ii) The distance the plane flies from Athens to Berlin is 1802 km.

Calculate the average speed of the plane.
Give your answer in kilometres per hour.

..... km/h [2]

36. 0580_w20_qp_42 Q: 1

Karel travelled from London to Johannesburg and then from Johannesburg to Windhoek.

(a) The flight from London to Johannesburg took 11 hours 10 minutes.
The average speed was 813 km/h.

Calculate the distance travelled from London to Johannesburg.
Give your answer correct to the nearest 10 km.

..... km [3]

(b) The total time for Karel's journey from London to Windhoek was 15 hours 42 minutes.
The total distance travelled from London to Windhoek was 10 260 km.

(i) Calculate the average speed for this journey.

..... km/h [2]

(ii) The cost of Karel's journey from London to Windhoek was $470.

(a) Calculate the distance travelled per dollar.

..... km per dollar [1]

(b) Calculate the cost per 100 km of this journey.
Give your answer correct to the nearest cent.

$ ..... per 100 km [2]

(c) Karel changed $300 into 3891 Namibian dollars.

Complete the statement.

$1 = ... Namibian dollars [1]

37. 0580_w20_qp_42 Q: 3

(a) Beth invests $2000 at a rate of 2% per year compound interest.

(i) Calculate the value of this investment at the end of 5 years.

$ ..... [2]

(ii) Calculate the overall percentage increase in the value of Beth's investment at the end of 5 years.

..... % [2]

(iii) Calculate the minimum number of complete years it takes for the value of Beth's investment to increase from $2000 to more than $2500.

..... [3]

(b) The population of a village decreases exponentially at a rate of 4% each year. The population is now 255.

Calculate the population 16 years ago.

..... [3]

38. 0580_w20_qp_43 Q: 1

(a) The Earth has a surface area of approximately 510 100 000 km^2.

(i) Write this surface area in standard form.

..... km^2 [1]

(ii) Water covers 70.8% of the Earth's surface.

Work out the area of the Earth's surface covered by water.

..... km^2 [2]

(b) The table shows the surface area of some countries and their estimated population in 2017.

Country	Surface area (km^2)	Estimated population in 2017
Brunei	5.77×10^3	433 100
China	9.60×10^6	1 388 000 000
France	6.41×10^5	67 000 000
Maldives	3.00×10^2	374 600

(i) Find the total surface area of Brunei and the Maldives.

..... km^2 [1]

(ii) The ratio surface area of the Maldives : surface area of China can be written in the form 1 : n.

Find the value of n.

n = ... [2]

(iii) Find the surface area of France as a percentage of the surface area of China.

..... % [2]

(iv) Find the population density of the Maldives.
[Population density = population ÷ surface area]

..... people/km^2 [2]

(c) The population of the Earth in 2017 was estimated to be 7.53×10^9.

The population of the Earth in 2000 was estimated to be 6.02×10^9.

(i) Work out the percentage increase in the Earth's estimated population from 2000 to 2017.

..... % [2]

(ii) Assume that the population of the Earth increased exponentially by y% each year for these 17 years.

Find the value of y.

y = ... [3]

39. 0580_m19_qp_42 Q: 1

Amol and Priya deliver 645 parcels in the ratio Amol : Priya = 11 : 4.

(a) Calculate the number of parcels Amol delivers.

..... [2]

(b) Amol drives his truck at an average speed of 50 km/h.
He leaves at 07 00 and arrives at 11 15.

Calculate the distance he drives.

..... km [2]

(c) Priya drives her van a distance of 54 km.
She leaves at 10 55 and arrives at 12 38.

Calculate her average speed.

..... km/h [3]

(d) Priya has 50 identical parcels.
Each parcel has a mass of 17 kg, correct to the nearest kilogram.

Find the upper bound for the total mass of the 50 parcels.

..... kg [1]

(e) 67 of the 645 parcels are damaged on the journey.

Calculate the percentage of parcels that are damaged.

..... % [1]

(f) **(i)** 29 parcels each have a value of $68.

By writing each of these numbers correct to 1 significant figure, find an estimate for the total value of these 29 parcels.

$ ..... [1]

(ii) Without doing any calculation, complete this statement.

The actual total value of these 29 parcels is less than the answer to **part (f)(i)**

because ..... [1]

40. 0580_s19_qp_41 Q: 8

(a) The price of a book increases from \$2.50 to \$2.65 .

Calculate the percentage increase.

..... % [3]

(b) Scott invests \$500 for 7 years at a rate of 1.5% per year simple interest.

Calculate the value of his investment at the end of the 7 years.

\$..... [3]

(c) In a city the population is increasing exponentially at a rate of 1.6% per year.

Find the overall percentage increase at the end of 20 years.

..... % [2]

(d) The population of a village is 6400.
The population is decreasing exponentially at a rate of r% per year.
After 22 years, the population will be 2607.

Find the value of r.

r = ... [3]

41. 0580_s19_qp_41 Q: 11

Brad travelled from his home in New York to Chamonix.

- He left his home at 16 30 and travelled by taxi to the airport in New York.
  This journey took 55 minutes and had an average speed of 18 km/h.

- He then travelled by plane to Geneva, departing from New York at 22 15.
  The flight path can be taken as an arc of a circle of radius 6400 km with a sector angle of 55.5°.
  The local time in Geneva is 6 hours ahead of the local time in New York.
  Brad arrived in Geneva at 11 25 the next day.

- To complete his journey, Brad travelled by bus from Geneva to Chamonix.
  This journey started at 13 00 and took 1 hour 36 minutes.
  The average speed was 65 km/h.
  The local time in Chamonix is the same as the local time in Geneva.

Find the overall average speed of Brad's journey from his home in New York to Chamonix.
Show all your working and give your answer in km/h.

..... km/h [11]

42. 0580_s19_qp_42 Q: 1

(a) The price of a newspaper increased from \$0.97 to \$1.13 .

Calculate the percentage increase.

..... % [3]

(b) One day, the newspaper had 60 pages of news and advertisements.
The ratio number of pages of news : number of pages of advertisements = 5 : 7.

(i) Calculate the number of pages of advertisements.

..... [2]

(ii) Write the number of pages of advertisements as a percentage of the number of pages of news.

..... % [1]

(c) On holiday Maria paid 2.25 euros for the newspaper when the exchange rate was \$1 = 0.9416 euros.
At home Maria paid \$1.13 for the newspaper.

Calculate the difference in price.
Give your answer in dollars, correct to the nearest cent.

\$ ..... [3]

(d) The number of newspapers sold decreases exponentially by x% each year.
Over a period of 21 years the number of newspapers sold decreases from 1 763 000 to 58 000.

Calculate the value of x.

$x =$ ..... [3]

(e) Every page of the newspaper is a rectangle measuring 43 cm by 28 cm, both correct to the nearest centimetre.

Calculate the upper bound of the area of a page.

..... cm^2 [2]

43. 0580_s19_qp_43 Q: 1

Here is part of a train timetable for a journey from London to Marseille.
All times given are in local time.
The local time in Marseille is 1 hour ahead of the local time in London.

London	0719
Ashford	0755
Lyon	1300
Avignon	1408
Marseille	1446

(a) (i) Work out the total journey time from London to Marseille.
Give your answer in hours and minutes.

..... h ..... min [2]

(ii) The distance from London to Ashford is 90 km.
The local time in London is the same as the local time in Ashford.

Work out the average speed, in km/h, of the train between London and Ashford.

..... km/h [3]

(iii) During the journey, the train takes 35 seconds to completely cross a bridge.
The average speed of the train during this crossing is 90 km/h.
The length of the train is 95 metres.

Calculate the length, in metres, of this bridge.

..... m [4]

(b) The fares for the train journey are shown in the table below.

From London to Marseille	Standard fare	Premier fare
Adult	\$84	\$140
Child	\$60	\$96

(i) For the **standard fare**, write the ratio adult fare : child fare in its simplest form.

..... : ..... [1]

(ii) For an **adult**, find the percentage increase in the cost of the standard fare to the premier fare.

..... % [3]

(iii) For one journey from London to Marseille, the ratio

number of adults : number of children = 11 : 2.

There were 220 adults in total on this journey.
All of the children and 70% of the adults paid the standard fare.
The remaining adults paid the premier fare.

Calculate the total of the fares paid by the adults and the children.

\$ ..... [5]

(c) There were 3.08×10^5 passengers that made this journey in 2018.
This was a 12% decrease in the number of passengers that made this journey in 2017.

Find the number of passengers that made this journey in 2017.
Give your answer in standard form.

..... [3]

44. 0580_w19_qp_41 Q: 2

(a) Ali and Mo share a sum of money in the ratio Ali : Mo = 9 : 7.
Ali receives \$600 more than Mo.

Calculate how much each receives.

Ali \$ .....

Mo \$ ..... [3]

(b) In a sale, Ali buys a television for \$195.80 .
The original price was \$220.

Calculate the percentage reduction on the original price.

..... % [3]

(c) In the sale, Mo buys a jacket for \$63.
The original price was reduced by 25%.

Calculate the original price of the jacket.

\$ ..... [3]

45. 0580_w19_qp_41 Q: 3

(a) Dina invests $600 for 5 years at a rate of 2% per year compound interest.

Calculate the value of this investment at the end of the 5 years.

$ ..... [2]

(b) The value of a gold ring increases exponentially at a rate of 5% per year.
The value is now $882.

(i) Calculate the value of the ring 2 years ago.

$ ..... [2]

(ii) Find the number of complete years it takes for the ring's value of $882 to increase to a value greater than $1100.

..... [2]

46. 0580_w19_qp_42 Q: 1

(a) Mohsin has 600 pear trees and 720 apple trees on his farm.

(i) Write the ratio pear trees : apple trees in its simplest form.

..... : ..... [1]

(ii) Each apple tree produces 16 boxes of apples each year.
One box contains 18 kg of apples.

Calculate the total mass of apples produced by the 720 trees in one year.
Give your answer in standard form.

..... kg [3]

(b) **(i)** One week, the total mass of pears picked was 18 540 kg.
For this week, the ratio mass of apples : mass of pears = 13 : 9.

Find the mass of apples picked that week.

..... kg [2]

(ii) The apples cost Mohsin \$0.85 per kilogram to produce.
He sells them at a profit of 60%.

Work out the selling price per kilogram of the apples.

\$ ..... [2]

(c) Mohsin exports some of his pears to a shop in Belgium.
The shop buys the pears at $1.50 per kilogram.
The shop sells the pears for 2.30 euros per kilogram.
The exchange rate is $1 = 0.92 euros.

Calculate the percentage profit per kilogram made by the shop.

..... % [5]

(d) Mohsin's earnings increase exponentially at a rate of 8.7% each year.
During 2018 he earned $195 600.

During 2027, how much **more** does he earn than during 2018?

$ ..... [3]

47. 0580_w19_qp_42 Q: 9

Car *A* and car *B* take part in a race around a circular track.
One lap of the track measures 7.6 km.

Car *A* takes 2 minutes and 40 seconds to complete each lap of the track.
Car *B* takes 2 minutes and 25 seconds to complete each lap of the track.
Both cars travel at a constant speed.

(a) Calculate the speed of car *A*.
Give your answer in kilometres per hour.

..... km/h [3]

(b) Both cars start the race from the same position, *S*, at the same time.

(i) Find the time taken when both car *A* and car *B* are next at position *S* **at the same time**.
Give your answer in minutes and seconds.

..... min ..... s [4]

(ii) Find the distance that car *A* has travelled at this time.

..... km [2]

48. 0580_w19_qp_43 Q: 1

(a) In a cycling club, the number of members are in the ratio males : females = 8 : 3.
The club has 342 females.

(i) Find the total number of members.

..... [2]

(ii) Find the percentage of the total number of members that are female.

..... % [1]

(b) The price of a bicycle is $1020.
Club members receive a 15% discount on this price.

Find how much a club member pays for this bicycle.

$ ..... [2]

(c) In 2019, the membership fee of the cycling club is $79.50 .
This is 6% more than last year.

Find the **increase** in the cost of the membership.

$ ..... [3]

(d) Asif cycles a distance of 105 km.
On the first part of his journey he cycles 60 km in 2 hours 24 minutes.
On the second part of his journey he cycles 45 km at 20 km/h.

Find his average speed for the whole journey.

..... km/h [4]

(e) Bryan invested \$480 in an account 4 years ago.
The account pays compound interest at a rate of 2.1% per year.
Today, he uses some of the money in this account to buy a bicycle costing \$430.

Calculate how much money remains in his account.

\$ ..... [3]

(f) The formula $s = \frac{1}{2}at^2$ is used to calculate the distance, s, travelled by a bicycle.

When $a = 3$ and $t = 10$, each correct to the nearest integer, calculate the lower bound of the distance, s.

..... [2]

49. 0580_m18_qp_42 Q: 1

(a) A shop sells dress fabric for $2.97 per metre.

(i) A customer buys 9 metres of this fabric.

Calculate the change he receives from $50.

$ ..... [2]

(ii) The selling price of $2.97 per metre is an increase of 8% on the cost price.

Calculate the cost price.

$ ..... per metre [3]

(b) A dressmaker charges $35 or 2300 rupees to make a dress.

Calculate the difference in price when the exchange rate is 1 rupee = $0.0153 .
Give your answer in rupees.

..... rupees [2]

(c) The dressmaker measures a length of fabric as 600 m, correct to the nearest 5 metres.
He cuts this into dress lengths of 9 m, correct to the nearest metre.

Calculate the largest number of complete dress lengths he could cut.

..... [3]

50. 0580_s18_qp_41 Q: 1

Adele, Barbara and Collette share \$680 in the ratio 9 : 7 : 4.

(a) Show that Adele receives \$306.

[1]

(b) Calculate the amount that Barbara and Collette each receives.

Barbara \$ .....

Collette \$ ..... [3]

(c) Adele changes her \$306 into euros (€) when the exchange rate is €1 = \$1.125 .

Calculate the number of euros she receives.

€ ..... [2]

(d) Barbara spends a total of \$17.56 on 5 kg of apples and 3 kg of bananas.
Apples cost \$2.69 per kilogram.

Calculate the cost per kilogram of bananas.

\$ ..... [3]

(e) Collette spends half of her share on clothes and $\frac{1}{5}$ of her share on books.

Calculate the amount she has left.

\$ ..... [3]

51. 0580_s18_qp_41 Q: 3

(a) The price of a house decreased from $82 500 to $77 500.

Calculate the percentage decrease.

..... % [3]

(b) Roland invests $12 000 in an account that pays compound interest at a rate of 2.2% per year.

Calculate the value of his investment at the end of 6 years.
Give your answer correct to the nearest dollar.

$ ..... [3]

52. 0580_s18_qp_42 Q: 1

(a) Here is a list of ingredients to make 20 biscuits.

260 g of butter
500 g of sugar
650 g of flour
425 g of rice

(i) Find the mass of rice as a percentage of the mass of sugar.

..... % [1]

(ii) Find the mass of butter needed to make 35 of these biscuits.

..... g [2]

(iii) Michel has 2 kg of each ingredient.

Work out the greatest number of these biscuits that he can make.

..... [3]

(b) A company makes these biscuits at a cost of $1.35 per packet.
These biscuits are sold for $1.89 per packet.

(i) Calculate the percentage profit the company makes on each packet.

..... % [3]

(ii) The selling price of $1.89 has increased by 8% from last year.

Calculate the selling price last year.

$ ..... [3]

(c) Over a period of 3 years, the company's sales of biscuits increased from 15.6 million packets to 20.8 million packets.
The sales increased exponentially by the same percentage each year.

Calculate the percentage increase **each year**.

..... % [3]

(d) The people who work for the company are in the following age groups.

Group A	Group B	Group C
Under 30 years	30 to 50 years	Over 50 years

The ratio of the number in group A to the number in group B is 7 : 10.
The ratio of the number in group B to the number in group C is 4 : 3.

(i) Find the ratio of the number in group A to the number in group C.
Give your answer in its simplest form.

..... : ..... [3]

(ii) There are 45 people in group C.

Find the total number of people who work for the company.

..... [3]

53. 0580_s18_qp_43 Q: 1

(a) Rowena buys and sells clothes.

(i) She buys a jacket for \$40 and sells it for \$45.40 .

Calculate the percentage profit.

..... % [3]

(ii) She sells a dress for \$42.60 after making a profit of 20% on the cost price.

Calculate the cost price.

\$ ..... [3]

(b) Sara invests \$500 for 15 years at a rate of 2% per year simple interest.

Calculate the total interest Sara receives.

\$ ..... [2]

(c) Tomas has two cars.

(i) The value, today, of one car is \$21 000.
The value of this car **decreases** exponentially by 18% each year.

Calculate the value of this car after 5 years.
Give your answer correct to the nearest hundred dollars.

\$ ..... [3]

(ii) The value, today, of the other car is \$15 000.
The value of this car **increases** exponentially by x% each year.
After 12 years the value of the car will be \$42 190.

Calculate the value of x.

x = ... [3]

54. 0580_w18_qp_42 Q: 1

(a) The Muller family are on holiday in New Zealand.

(i) They change some euros (€) and receive $1962 (New Zealand dollars).
The exchange rate is €1 = $1.635 .

Calculate the number of euros they change.

€ ..... [2]

(ii) The family spend 15% of their New Zealand dollars on a tour.

Calculate the number of dollars they have left.

$ ..... [2]

(iii) The family visit two waterfalls, the Humboldt Falls and the Bridal Veil Falls.
The ratio of the heights Humboldt Falls : Bridal Veil Falls = 5 : 1.
The Humboldt Falls are 220 m higher than the Bridal Veil Falls.

Calculate the height of the Humboldt Falls.

..... m [2]

(b) **(i)** Water flows over the Browne Falls at a rate of 3680 litres per second.
After rain, this rate increases to 9752 litres per second.

Calculate the percentage increase in this rate.

..... % [3]

(ii) After rain, water flows over the Sutherland Falls at a rate of 74 240 litres per second.
This is an increase of 45% on the rate before the rain.

Calculate the rate before the rain.

..... litres/second [3]

55. 0580_w18_qp_43 Q: 2

(a) A school has 240 students.
The ratio girls : boys = 25 : 23.

(i) Show that the number of boys is 115.

[1]

(ii) One day, there are 15 girls absent and 15 boys absent.

Find the ratio girls : boys in school on this day.
Give your answer in its simplest form.

..... : ..... [2]

(iii) Next year, the number of students will increase by 15%.

Calculate the number of students next year.

..... [2]

(iv) Since the school was opened, the number of students has increased by 60%.
There are now 240 students.

Calculate the number of students when the school was opened.

..... [3]

(b) The population of a city is increasing exponentially at a rate of 2% each year.
The population now is 256 000.

Calculate the population after 30 years.
Give your answer correct to the nearest thousand.

..... [3]

(c) A bacteria population increases exponentially at a rate of r% each day.
After 32 days, the population has increased by 309%.

Find the value of r.

r = ... [3]

56. 0580_m17_qp_42 Q: 1

The Smith family paid $5635 for a holiday in India.
The total cost was divided in the ratio travel : accommodation : entertainment = 10 : 17 : 8.

(a) Calculate the percentage of the total cost spent on entertainment.

.....% [2]

(b) Show that the amount spent on accommodation was $2737.

[2]

(c) The $5635 was the total amount Mr Smith received from an investment he made 5 years ago.
Compound interest at a rate of 2.42% per year was paid on this investment.

Calculate the amount he invested 5 years ago.

$ ..... [3]

(d) Mr Smith, his wife and their three children visit a theme park.
The tickets cost 2500 Rupees for an adult and 1650 Rupees for a child.

Calculate the total cost of the tickets.

..... Rupees [2]

(e) One day the youngest child spent 130 Rupees on sweets.
On this day the exchange rate was 1 Rupee = $0.0152 .

Calculate the value of the sweets in dollars, correct to the nearest cent.

$ ..... [2]

57. 0580_s17_qp_41 Q: 1

An energy company charged these prices in 2013.

Electricity price	Gas price
23.15 cents per day plus 13.5 cents for each unit used	24.5 cents per day plus 5.5 cents for each unit used

(a) **(i)** In 90 days, the Siddique family used 1885 units of **electricity**.

Calculate the total cost, in dollars, of the electricity they used.

$ ..... [2]

(ii) In 90 days, the **gas** used by the Khan family cost $198.16 .

Calculate the number of units of gas used.

..... units [3]

(b) In 2013, the price for each unit of electricity was 13.5 cents.
Over the next 3 years, this price increased exponentially at a rate of 8% per year.

Calculate the price for each unit of electricity after 3 years.

..... cents [2]

(c) Over these 3 years, the price for each unit of gas increased from 5.5 cents to 7.7 cents.

(i) Calculate the percentage increase from 5.5 cents to 7.7 cents.

..... % [3]

(ii) Over the 3 years, the 5.5 cents increased exponentially by the same percentage each year to 7.7 cents.

Calculate the percentage increase **each year**.

..... % [3]

(d) In 2015, the energy company divided its profits in the ratio

shareholders : bonuses : development $= 5 : 2 : 6$.

In 2015, its profits were \$390 million.

Calculate the amount the company gave to shareholders.

\$ ..... million [2]

(e) The share price of the company in June 2015 was \$258.25 .
This was an increase of 3.3% on the share price in May 2015.

Calculate the share price in May 2015.

\$ ..... [3]

58. 0580_s17_qp_42 Q: 1

(a) Annie and Dermot share \$600 in the ratio 11 : 9.

(i) Show that Annie receives \$330.

[1]

(ii) Find the amount that Dermot receives.

\$ ..... [1]

(b) **(i)** Annie invests \$330 at a rate of 1.5% per year compound interest.

Calculate the amount that Annie has after 8 years.
Give your answer correct to the nearest dollar.

\$ ..... [3]

(ii) Find the amount of **interest** that Annie has, after the 8 years, as a percentage of the \$330.

..... % [2]

(c) Dermot has \$70 to spend.
He spends \$24.75 on a shirt.

(i) Find \$24.75 as a fraction of \$70.
Give your answer in its lowest terms.

..... [1]

(ii) The \$24.75 is the sale price after reducing the original price by 10%.

Calculate the original price.

\$ ..... [3]

(d) After one year, the value of Annie's car had reduced by 20%.
At the end of the second year, the value of Annie's car had reduced by a further 15% of its value at the end of the first year.

(i) Calculate the overall percentage reduction after the two years.

..... % [2]

(ii) After three years the overall percentage reduction in the value of Annie's car is 40.84%.

Calculate the percentage reduction in the third year.

..... % [2]

59. 0580_s17_qp_43 Q: 1

(a) In 2016, a company sold 9600 cars, correct to the nearest hundred.

(i) Write down the lower bound for the number of cars sold.

..... [1]

(ii) The average profit on each car sold was \$2430, correct to the nearest \$10.

Calculate the lower bound for the total profit.
Write down the exact answer.

\$..... [2]

(iii) Write your answer to **part (a)(ii)** correct to 4 significant figures.

\$..... [1]

(iv) Write your answer to **part (a)(iii)** in standard form.

\$..... [1]

(b) In April, the number of cars sold was 546.
This was an increase of 5% on the number of cars sold in March.

Calculate the number of cars sold in March.

..... [3]

(c) The price of a new car grows exponentially by 3% per year.
A new car has a price of \$3000 in 2013.

Find the price of a new car 4 years later.

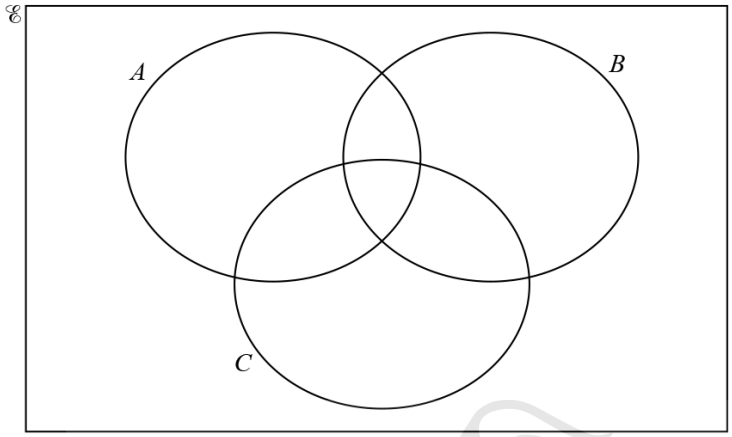
\$..... [2]

---

60. 0580_s17_qp_43 Q: 10

$\mathscr{E}$ = {21, 22, 23, 24, 25, 26, 27, 28, 29, 30}
A = { x : x is a multiple of 3}
B = { x : x is prime}
C = { x : $x \leqslant 25$}

(a) Complete the Venn diagram.



[4]

(b) Use set notation to complete the statements.

(i) 26 ..... B [1]

(ii) $A \cap B$ = ... [1]

(c) List the elements of $B \cup (C \cap A)$.

..... [2]

(d) Find

(i) n(C),

..... [1]

(ii) n($B' \cup (B \cap C)$).

..... [1]

(e) $(A \cap C)$ is a subset of $(A \cup C)$.

Complete this statement using set notation.

$(A \cap C)$ ..... $(A \cup C)$ [1]

61. 0580_w17_qp_41 Q: 1

(a) A library has a total of 10494 fiction and non-fiction books.
The ratio fiction books : non-fiction books = 13 : 5.

Find the number of non-fiction books the library has.

..... [2]

(b) The library has DVDs on crime, adventure and science fiction.
The ratio crime : adventure : science fiction = 11 : 6 : 10.
The library has 384 **more** science fiction DVDs than adventure DVDs.

Calculate the number of crime DVDs the library has.

..... [2]

(c) Every Monday, Sima travels by car to the library.
The distance is 20 km and the journey takes 23 minutes.

(i) Calculate the average speed for the journey in kilometres per hour.

..... km/h [2]

(ii) One Monday, she is delayed and her average speed is reduced to 32 km/h.

Calculate the percentage increase in the journey time.

..... % [5]

(d) In Spain, the price of a book is 11.99 euros.
In the USA, the price of the same book is $12.99 .
The exchange rate is $1 = 0.9276 euros.

Calculate the difference between these prices.
Give your answer in dollars, correct to the nearest cent.

$..... [3]

(e) 7605 books were borrowed from the library in 2016.
This was 22% less than in 2015.

Calculate the number of books borrowed in 2015.

..... [3]

62. 0580_w17_qp_42 Q: 1

(a) Alex has \$20 and Bobbie has \$25.

(i) Write down the ratio Alex's money : Bobbie's money in its simplest form.

..... : ..... [1]

(ii) Alex and Bobbie each spend $\frac{1}{5}$ of their money.

Find the ratio Alex's remaining money : Bobbie's remaining money in its simplest form.

..... : ..... [1]

(iii) Alex and Bobbie **then** each spend \$4.

Find the new ratio Alex's remaining money : Bobbie's remaining money in its simplest form.

..... : ..... [2]

(b) **(i)** The population of a town in the year 1990 was 15 600.
The population is now 11 420.

Calculate the percentage decrease in the population.

.....% [3]

(ii) The population of 15 600 was 2.5% less than the population in the year 1980.

Calculate the population in the year 1980.

..... [3]

(c) Chris invests \$200 at a rate of x% per year simple interest.
At the end of 15 years the total interest received is \$48.

Find the value of x.

$x =$ ..... [2]

(d) Dani invests \$200 at a rate of y% per year compound interest.
At the end of 10 years the value of her investment is \$256.

Calculate the value of y, correct to 1 decimal place.

$y =$ ..... [3]

Appendix A

Answers

1. 0580_m24_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	8.24 cao	**2**	**M1** for $3\times1.04+4\times1.28$
(b)(i)	32	**2**	**M1** for $\frac{8}{11+8+6}[\times100]$ oe
(b)(ii)	360	**2**	**M1** for $\frac{1500}{11+8+6}\times k$ where $k = 1$, 11, 8 or 6
(b)(iii)	270	**1**	**FT** 0.75 × *their* 360
(b)(iv)	1.25 cao	**2**	**M1** for $x\times\left(1-\frac{8}{100}\right)=1.15$ oe or better
(c)	140 nfww	**3**	**M2** for $\frac{620 \text{ to } 640}{5-0.5}$ or $\frac{620+10}{4 \text{ to } 5}$ oe or **M1** for 620 +10 oe or 620 – 10 oe or 5 + 0.5 oe or 5 – 0.5 oe seen

2. 0580_m24_ms_42 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	5	3	**M2** for $\frac{(12800-8000)\times 100}{8000\times 12}$ or **M1** for $[12800-8000=]\frac{8000\times 12\times r}{100}$ or 400 seen If 0 scored, **SC1** for answer 13.3 or 13.33…
(a)(ii)	4[.0] or 3.99…	3	**M2** for $\sqrt[12]{\frac{12800}{8000}}$ or **M1** for $12800=8000\times k^{12}$ for any k

Question	Answer	Marks	Partial Marks
(b)	9 nfww	3	**M2** for $260\,000\times\left(1+\frac{1.8}{100}\right)^{8}$ oe evaluated to 4 sf or better or $260\,000\times\left(1+\frac{1.8}{100}\right)^{9}$ oe evaluated to 2 sf or better or **M1** for $[300\,000 =]\ 260\,000\times\left(1+\frac{1.8}{100}\right)^{n}$ oe soi (Accept any inequality sign in [300 000 =])

3. 0580_s24_ms_41 Q: 1

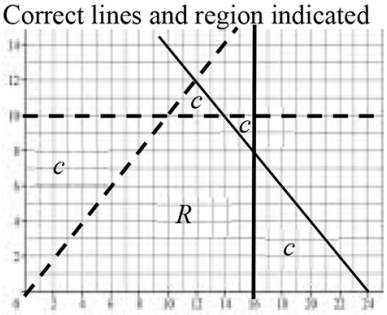
Question	Answer	Marks	Partial Marks
(a)(i)	4.55 or 4.545…	**1**	
(a)(ii)	50 : 263 : 400 cao	**2**	**M1** for a correct simplification from 250 000 : 1 315 000 : 2 000 000
(a)(iii)	83 cao	**3**	**M2** for $\frac{43\frac{1}{3}}{100}\times(100-60-10)$ oe or **M1** for 100 – 60 – 10 seen
(a)(iv)	10 200 000 cao	**3**	**B2** for 10 185 185 to 10 185 200 or **M1** for 5 500 000 ÷ 27 [× 50]
(a)(v)	3.19×10^7 or $3.190\ldots \times 10^7$	**3**	**B2** for 31903920 or **M1** for 60.7 × 60 × 24 × 365 If B0 scored **SC1** for correctly converting *their* number seen to standard form to 3sf or better
(b)	2095 nfww	**3**	**M2** for 6445 – C where $4300 \leqslant C < 4400$ oe or A – 4350 where $6440 < A \leqslant 6450$ oe or **M1** for 6440 +5 or 6440 –5 or 4400 + 50 or 4400 – 50 seen oe

4. 0580_s24_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	10 : 3 final answer	2	**M1** for 1500 : 450 oe in ratio form If 0 scored **SC1** for answer 3 : 10
(b)	360 240 400	3	**B2** for answer 0.36 0.24 0.4 or for answer two of 360 240 400 or **M1** for $\frac{1000}{9+6+10}[\times k]$ where $k = 1, 9, 6$ or 10 If 0 scored, **SC1** for answer with 3 values in ratio 9 : 6 : 10 in that order
(c)	3.68 cao	2	**M1** for $\left(1+\frac{15}{100}\right)\times 3.2$ oe or **B1** for answer 0.48
(d)	18 804[.0...]	2	**1** for $16620\times\left(1+\frac{2.5}{100}\right)^5$ oe
(e)	3.95	3	**M2** for 22.5 – (18.5 to 18.6) or (22 to 23) −18.55 or **M1** for 23 – 0.5 oe seen or 23 + 0.5 oe seen or 18.5– 0.05 oe seen or 18.5 + 0.05 oe seen

5. 0580_s24_ms_42 Q: 8

Question	Answer	Marks	Partial Marks
(a)	$y < 10$ $y < x$ oe $x + y \leqslant 24$ oe	3	**B1** for each If 0 scored, **SC1** for $y \leqslant 10$ and $y \leqslant x$ and $x + y < 24$

Question	Answer	Marks	Partial Marks
(b)	Correct lines and region indicated  	6	**B1** for each correct line and **B2** for R in correct region for all 4 correct lines or **B1** for R in any one of the regions marked *c* or **B1** for R that satisfies 3 of the correct inequalities
(c)	228 nfww	2	**M1** for $8x + 12y$ for any (x, y) in *their* R, x, y both integer or $x = 15$, $y = 9$

6. 0580_s24_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	3050	2	**M1** for $50 \times 40 + 70 \times 15$ or better
(a)(ii)	91.1 or 91.14 to 91.15	1	**FT** $\frac{2780}{their\,3050} \times 100$
(a)(iii)	125 nfww	2	**M1** for [...] × $\frac{100-4}{100}$ =120 oe
(a)(iv)(a)	132	2	**B1** for increase of 6 in adult or junior or **M1** for 56 : 76 or for multiples of 33 seen 33, 66, 99, 132, … or $50 + x : 70 + x = 14 : 19$ oe or $(70 - 50) \times \frac{19+14}{19-14}$ oe or $50 + x = (120 + 2x) \times \frac{14}{19+14}$ oe
(a)(iv)(b)	10	2	**FT** $\frac{their\,\mathbf{(a)}-120}{120} \times 100$ dep on *their* **(a)** > 120 **M1** for $\frac{their\,\mathbf{(a)}-120}{120}[\times 100]$ or $\frac{their\,\mathbf{(a)}}{120} \times 100\,[-100]$
(b)(i)	2280 or 2281 to 2282 nfww	2	**M1** for $2500 \times \left(1 - \frac{3}{100}\right)^3$ oe
(b)(ii)	8	2	**M1** for $2500 \times \left(1 - \frac{3}{100}\right)^n$ or 0.97^n evaluated with $n > 3$

7. 0580_s24_ms_43 Q: 7

Question	Answer	Marks	Partial Marks
(a)(i)	40	2	**M1** for $\frac{50}{75}$ [× 60] oe
(a)(ii)	36 nfww	3	**M2** for $\frac{47-0.5}{75\text{ to }80}$ [× 60] or $\frac{46\text{ to }47}{75+2.5}$ [× 60] or **M1** for 47+0.5 or 47 – 0.5 or 75 + 2.5 or 75– 2.5

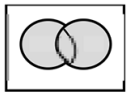
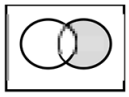
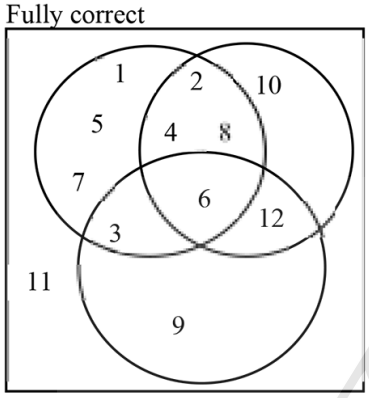
Question	Answer	Marks	Partial Marks
(b)	107 or 107.2...	6	**M5** for [speed =] $\frac{240}{\left(2\times\frac{260}{7}+60\right)}$ × 60 oe OR **B5** for [total time =] 134 or 134.2 to 134.3 or 2.24 or 2.238... or **B4** for (t =) 37.1 or 37.14... OR **M2** for $\frac{t}{60}\times 100+\frac{t+60}{60}\times 110=240$ oe or **M1** for $\frac{t}{60}\times 100$ or $\frac{t+60}{60}\times 110$ oe **M1** for correct equation of form $at = b$ from *their* equation containing two terms in t and involving the speeds. **M1** for $\frac{240}{2\times \textit{their}\, t+60}$ [× 60]

8. 0580_m23_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{750}{8+7}\times 8$ [= 400]	M1	
(a)(ii)(a)	37.5	1	
(a)(ii)(b)	275	3	**M2** for $250+\frac{250\times 2\times 5}{100}$ oe or **M1** for $\frac{250\times 2\times 5}{100}$ oe
(a)(iii)	407[.00] cao nfww	3	**B2** for 406.5 to 406.7 or **M1** for $350\times\left(1+\frac{0.25}{100}\right)^{60}$ oe isw If 0 scored **SC1** for answer 354 or answer 406
(b)	24	2	**M1** for [C : D =] 6 : 10 oe and [C : E =] 6 : 9 oe or for $\frac{6}{6+10+9}$[×100] oe

Question	Answer	Marks	Partial Marks
(c)	56 000 nfww	3	**M2** for $60564\div\left(1+\frac{3}{100}\right)\div\left(1+\frac{5}{100}\right)$ oe or **M1** for $[x\times]\left(1+\frac{3}{100}\right)\times\left(1+\frac{5}{100}\right)$ or for $60564\div\left(1+\frac{3}{100}\right)$ oe or $60564\div\left(1+\frac{5}{100}\right)$ If 0 scored, **SC1** for answer 65499 to 65500
(d)	2.5[0] or 2.499...	3	**M2** for $\sqrt[8]{\frac{609.20}{500}}$ oe or **M1** for $500\times(...)^8=609.2[0]$ oe

9. 0580_s23_ms_41 Q: 9

Question	Answer	Marks	Partial Marks
(a)(i)	*r, l, t, e, a*	**1**	
(a)(ii)	2	**1**	
(b)		**1**	
		**1**	
(c)(i)	Fully correct 	**3**	**B2** for 7, 6, or 5 sections correct or **B1** for 4, 3 or 2 sections correct
(c)(ii)	5	**1FT**	strict FT from their diagram

10. 0580_s23_ms_42 Q: 2

Question	Answer	Marks	Partial Marks
(a)	249.98 to 250[.0…]	**3**	**M2** for 830 – 500 × 1.16 or **M1** for 500 × 1.16 OR **M1** for 830 ÷ 1.16 **M1** for (*their* 715.5… – 500) × 1.16

Question	Answer	Marks	Partial Marks
(b)(i)	33.5 or 33.51…	**2**	**M1** for $\frac{12400}{37000}$ [×100] oe If 0 scored, **SC1** for answer 66.5 or 66.48 to 66.49
(b)(ii)	38 184 cao	**2**	**M1** for $37\,000 \times \left(1+\frac{3.2}{100}\right)$ oe or **B1** for 1184
(c)(i)	441 or 440.6 or 440.64 to 440.65	**3**	**B2** for answer 3941 or 3940.6 or 3940.64 to 3940.65 or **M2** for $3500 \times \left(1+\frac{2.4}{100}\right)^5 - 3500$ or **M1** for $3500 \times \left(1+\frac{2.4}{100}\right)^5$ oe isw
(c)(ii)	16	**3**	**B2** for 15[.0] nfww to 15.1 or **M2** for $3500 \times \left(1+\frac{2.4}{100}\right)^{15}$ oe seen or $3500 \times \left(1+\frac{2.4}{100}\right)^{16}$ oe seen or **M1** for (3500 or *their* 3941) $\times \left(1+\frac{2.4}{100}\right)^n$ associated with 5000 oe

Question	Answer	Marks	Partial Marks
(a)(i)	22.5	**2**	**M1** for $\frac{9}{14+17+9}$ [×100]
(a)(ii)	238	**2**	**FT** *their* 14 + 17 + 9 = *N* seen in **(a)(i)** **M1** for $\frac{560}{\textit{their}\ (14+17+9)} \times k$, where k = 1, 9, 14 or 17
(a)(iii)	METHOD 1 1.25 × 195 oe	**M2**	**M1** for $\frac{25}{100} \times 195$
	243[.75] and No oe	**A1**	Strict **FT** yes if *their* **(a)(ii)** > 243.75 If M0 scored, then **SC1** for 243.75 and a correct conclusion.
	METHOD 2 $\frac{\textit{their}\ 238}{195} - 1 = 0.22\ldots$ oe	**(M2)**	**M1** for $\frac{\textit{their}\ 238}{195} = 1.22\ldots$ oe
	22[%] (or better) and No oe	**(A1)**	Strict **FT** yes if *their* **(a)(ii)** gives answer > 25 If M0 scored, then **SC1** for 22.05 and a correct conclusion.
	METHOD 3 195 × 0.25 = 48.75 oe **and** *their* 238 – 195 = 43	**(M2)**	**M1** for 0.25 × 195
	43 **and** 48.75 and NO	**(A1)**	Strict **FT** yes if *their* **(a)(ii)** gives profit > 48.75 If M0 scored, then **SC1** for 43 and 48.75 and a correct conclusion.
	METHOD 4 $\frac{\textit{their}\ 238}{125} \times 100$	**(M2)**	**M1** for $x \times \left(1+\frac{25}{100}\right) = \textit{their}\ 238$
	190.4 and NO	**(A1)**	Strict **FT** yes if *their* **(a)(ii)** gives answer > 195 If M0 scored then **SC1** for 190.4 and a correct conclusion.
(b)	56.55	**2**	**M1** for $\frac{725 \times 1.3[\times 6]}{100}$ oe

Question	Answer	Marks	Partial Marks
(c)	48.5[0]	**2**	**M1** for $x \times \left(1-\frac{24}{100}\right) = 36.86$ oe

12. 0580_w23_ms_41 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	227 900 000	**1**	

Question	Answer	Marks	Partial Marks
(a)(ii)	51 200 or 51 190 or 51 194	**2**	**M1** for $\frac{35.8}{100} \times 143\,000$ After 0 scored SC1 for answer figs 512 or figs 5119 or figs 51194
(a)(iii)	2.43 or 2.434…	**1**	
(a)(iv)	3000 or 3004 to 3005	**2**	**M1** for $\frac{4.495\times10^{9}}{1.496\times10^{8}}$ [× 100] oe After 0 scored SC1 for answer figs 3 or figs 3004…. or figs 3005
(a)(v)	1.52 or 1.522…	**2**	**B1** for 1AU = 1.5[0] × 10^8 or 1.497… × 10^8 [km] or $1\text{km} = 6.68\times10^{-9}$ *or* $6.678\ldots\times10^{-9}$ [AU] OR **M1** for $\frac{5.2\times2.279[\times10^{8}]}{7.786[\times10^{8}]}$ oe After 0 scored **SC1** for answer figs 152 or figs 1522……
(a)(vi)	4890 or 4885…	**2**	**M1** for $d \times \left(1+\frac{39.2}{100}\right) = 6800$ oe
(b)(i)	2.9979 × 10^5 × 60^2 × 24 × 365.25	**M1**	After **M0** **SC1** for 2.9979 × 10^5 × 31557600 oe
	= 9.4606… × 10^{12}	**A1**	
(b)(ii)	2.54 or 2.536 to 2.537	**2**	**M1** for $\frac{2.4\times10^{19}}{9.461\times10^{12}}$ oe

13. 0580_w23_ms_42 Q: 3

Question	Answer	Marks	Partial Marks
(a)(i)	6925.5[0] cao	**2**	**M1** for $7695 \times \frac{100-10}{100}$ oe or **B1** for answer 769.5
(a)(ii)	8550	**2**	**M1** for $X \times \frac{100-10}{100} = 7695$ oe

Question	Answer	Marks	Partial Marks
(b)	660	**3**	**B2** for 60 or **M2** for $600 + \frac{600 \times 2 \times 5}{100}$ oe or **M1** for $\frac{600 \times 2[\times 5]}{100}$ oe
(c)	1.55 or 1.549 to 1.550	**3**	**M2** for $\sqrt[12]{\frac{601.35}{500}}$ or **M1** for $500 \times (...)^{12} = 601.35$
(d)(i)	26.3 or 26.25 to 26.26	**2**	**M1** for $[k]\left(\frac{100-3}{100}\right)^{10}$ oe
(d)(ii)	23	**3**	**M2** for a correct trial evaluated with n =22 or n = 23 or **M1** for $[k]\ (0.97)^n < 0.5[k]$ oe soi or for $[k](0.97)^n = 0.5[k]$ oe soi, implied by one correct trial $n > 10$ or for $[k](0.97)^{23}$ oe seen If 0 scored **SC1** for answer 22

14. 0580_w23_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	18593 cao	2	**M1** for $7437.05 \times 250 \div 100$ oe
(b)	804.53 cao	2	**M1** for $5400 \div 671.20$ [$\times 100$] oe
(c)(i)	2000	2	**M1** for $3500 \div (4 + 3)$ [$\times k$] oe
(c)(ii)	1354.13 …	3	**M2** for (3500 – *their* **(c)(i)**) $\times \frac{77.05}{85.35}$ oe or **M1** for (3500 – *their* **(c)(i)**) ÷ figs 85.35 oe or for $\frac{77.05}{85.35}$ oe or for (3500 – *their* **(c)(i)**) × figs 77.05
(c)(iii)	2 [h] 52 [min] nfww	3	**M2** for $\frac{2100 \text{ to } 2200}{740+10}$ or $\frac{2200-50}{740 \text{ to } 760}$ or **M1** for 2200 + 50 or 2200 – 50 or 740 + 10 or 740 – 10

15. 0580_m22_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	184	2	**M1** for $\frac{852-300}{300}$[$\times 100$] oe or for $\frac{852}{300} \times 100$[$-100$] oe
(b)	497	2	**M1** for $\frac{852}{5+7} \times k$ oe where $k = 1$, 5 or 7
(c)(i)	Forty thousand six hundred	1	
(c)(ii)	4.06×10^4	1	
(d)	435	3	**M2** for $3000 \times \left(1 - \frac{48}{100} - \frac{3}{8}\right)$ oe or **B2** for 2565, or 1440 **and** 1125 or 1875 **and** 1440 or 1560 **and** 1125 or **M1** for $1 - \frac{48}{100} - \frac{3}{8}$ or $3000 \times \left(\frac{48}{100} + \frac{3}{8}\right)$ oe or **B1** for 1440 or 1125 or 1560 or 1875 If 0 scored **SC1** for answer 975
(e)	35.7	3	**M2** for $\frac{100+15}{100} \times \frac{100+18}{100}$ [-1] oe or better or **M1** for $k \times \frac{100+15}{100} \times \frac{100+18}{100}$ oe

16. 0580_s22_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)	42	2	**M1** for $12 \div 2$ or better
(b)(i)	5.72	2	**M1** for $\frac{100-12}{100} \times 6.50$ oe or **B1** for 0.88 oe
(b)(ii)	12.5[0]	2	**M1** for $\frac{100-12}{100} \times x = 11$ or better oe

Question	Answer	Marks	Partial Marks
(c)	4	2	**M1** for $\frac{100+2.5}{100} \times [...] = \frac{100+6.6}{100}$ oe
(d)(i)	72.3 or 72.31...	2	**M1** for $80 \times \left(\frac{100-2}{100}\right)^5$ oe
(d)(ii)	4 nfww	3	**B2** for answer 9 nfww or **M2** for correct trials with values giving either side of 67 or **M1** for $80 \times \left(\frac{100-2}{100}\right)^n = 67$ or *their*$(i) \times \left(\frac{100-2}{100}\right)^k = 67$ or an evaluated trial with $n \geqslant 6$ or $k \geqslant 1$

17. 0580_s22_ms_42 Q: 1

Question	Answer	Marks	Partial Marks
(a)	150	**2**	**B1** for answer $150k$ or **M1** for prime factors of 30 or 75 seen or a list of multiples of both 30 and 75 with at least 3 of each or for $\frac{30\times 75}{15}$ oe or for answer $2 \times 3 \times 5^2$
(b)	152 190 266	**3**	Accept in any order **B2** for two correct answers or **M1** for $\frac{608}{4+5+7}\times k$ oe where k =1, 4, 5, 7
(c)	2.61×10^{-2} 2.61×10^{-2} or $2.608\ldots \times 10^{-2}$	**2**	**B1** for figs 2608 or 261 seen If 0 scored, **SC1** for answer $2.6[0] \times 10^{-2}$ without more accurate value in standard form seen
(d)	$\frac{27}{99}$ oe fraction	**1**	
(e)	2.8	**1**	
	g/cm^3 or $g\ cm^{-3}$	**1**	

18. 0580_s22_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)	10 07	**1**	
(b)	123	**2**	**M1** for 10 30 – 8 27 soi or 10 30 – 8 52 + 25 soi or 25 + 50 + 48
(c)	$25.2, 25\frac{1}{5}$	**2**	**M1** for figs 29.4 ÷ 70 [× 60] oe
(d)	\$142.1[0] cao	**4**	**M2** for [adults =] 56 ÷ 8 × 5 and [child =] 56 ÷ 8 × 3 or better or **M1** for 56 ÷ (5 + 3) × k where k = 1, 3 or 5 **M1** for *their* 35 × 2.80 + *their* 21 × 2.80 × $\frac{3}{4}$ oe

19. 0580_w22_ms_41 Q: 2

Question	Answer	Marks	Partial Marks
(a)(i)	2990 cao	1	
(a)(ii)	1.0 cao	1	
(a)(iii)	2100 cao	1	
(b)	97	1	
(c)	$\frac{1}{64}$ final answer	1	
(d)	$7.01[0] \times 10^{-3}$	1	
(e)	1.65×10^{x}	2	**M1** for final answer figs 165 or for $15\times10^{x-1}$ seen or for 0.15×10^{x} seen

Question	Answer	Marks	Partial Marks
(f)	37.7... – 3.7... [= 34] oe	M1	
	$\frac{34}{90}$ oe fraction	B1	

20. 0580_w22_ms_41 Q: 4

Question	Answer	Marks	Partial Marks
(a)(i)	550 nfww	3	**M2** for $\frac{500\times2\times5}{100}+500$ oe or **M1** for $\frac{500\times2\times5}{100}$ oe
(a)(ii)	546.65	2	**M1** for $500\times\left(1+\frac{1.8}{100}\right)^{5}$ oe
(a)(iii)	8 nfww	3	**B2** for final answer 13 OR **M2** for trials correctly comparing both investments to 7 and 8 more years or **M1** for at least two trials correctly comparing both investments

Question	Answer	Marks	Partial Marks
(b)	1476 cao	3	**B2** for 1480 or 1476.2 ... OR **M1** for $2500\times\left(1-\frac{10}{100}\right)^{5}$ oe **B1** for their more accurate answer seen correctly rounded to the nearest dollar.
(c)	3.2[0] or 3.200 to 3.201	3	**M2** for $(...) = \sqrt[22]{2}$ oe isw or **M1** for $[N] \times (...)^{22} = 2[N]$

21. 0580_w22_ms_42 Q: 5

Question	Answer	Marks	Partial Marks
(a)(i)	$\frac{14}{18}$ oe	1	
(a)(ii)	17.5	4	**M3** for $\frac{1}{2}(10+24)18+22\times24-134=40v$ oe or **M2** for $\frac{1}{2}(10+24)18+22\times24$ oe or **B2** for [distance covered by bus =] 700 or **M1** for correct method for any partial area for the car or for $40v$
(b)	92.8 or $92\frac{4}{5}$	3	**M1** for $\frac{figs162[4]}{their10\,min30\,sec}$ oe **M1** for correct conversion to km/h, e.g. $\times\frac{60}{1000}$

22. 0580_w22_ms_43 Q: 1

Question	Answer	Marks	Partial Marks
(a)(i)	60.9 or 60.86 to 60.87	1	
(a)(ii)	375	2	**M1** for $\frac{250}{12}$ [× 18] oe
(a)(iii)	30 nfww	3	**M1** for figs2200 ÷ 800 [× 12]oe **M1** for 1500 ÷ 600 [× 12] oe
(b)(i)	1.92	2	**M1** for $k \times \left(1+\frac{25}{100}\right) = 2.4[0]$ oe or better
(b)(ii)	43.75 or $43\frac{3}{4}$	3	**M2** for $\left(\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)[-1]\right)[\times 100]$ oe or $\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)\times 100\,[-100]$ or for $\frac{2.40\times\left(1+\frac{15}{100}\right)}{\textit{their}\textbf{(b)(i)}}\times 100$ [– 100] oe or **M1** for $2.40\times\left(1+\frac{15}{100}\right)$ or $\left(1+\frac{25}{100}\right)\times\left(1+\frac{15}{100}\right)$ oe
(c)	18 nfww	3	**M2** for $\frac{200 \text{ to } 210}{11.5-0.25}$ or $\frac{200+5}{11 \text{ to } 11.5}$ oe or **M1** for 200 + 5, 200 – 5, 11.5 + 0.25 or 11.5 – 0.25

23. 0580_m21_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	245	1	
(b)	8	2	**M1** for 40 + 26.5x = 252 oe or **B1** for 212 seen
(c)	6	2	**M1** for (224 – 2 × 48) ÷ 32 oe or 2 × 48 + 32 (x – 2) = 224 soi
(d)	35 : 36 : 32 final answer	2	**B1** for *their* (a) : 252 : 224 or equivalent ratio

24. 0580_m21_ms_42 Q: 10

	Answer	Mark	Partial Marks
(a)	1600	3	**B2** for answer figs 16 or **M2** for 90.72 ÷ (figs45 × figs3 × figs42) or **M1** for volume = figs 45 × figs 3 × figs 42 isw
(b)	62.8 or 62.83 to 62.84	3	**M2** for $\frac{\pi \times 10^2 \times 30}{15000} \times 100$ or **M1** for $\pi \times 10^2 \times 30$
(c)	12.9[0]	3	**B2** for 86 OR **M2** for $\frac{98.9}{1+\frac{15}{100}} \times 0.15$ oe or $98.9 - \frac{98.9}{1+\frac{15}{100}}$ oe or **M1** for $\left(1+\frac{15}{100}\right)a = 98.9$ oe isw
(d)	50	2	**M1** for 3540 ÷ 70.8

25. 0580_s21_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	28	2	**M1** for $32 \times 0.50 + 30 \times 0.40$
(a)(ii)	98 – 100 × 0.5 48 ÷ 0.4 = 120 [minutes] = 2 [hrs]	M3	**M1** for $100 \times 0.50 + x \times 0.40 = 98$ **M1** for $50 + 0.4x = 98$ or $0.4x = 48$ **M1** for $x = \frac{48}{0.4}$ x = 120 [min] = 2 [hr] OR **M1** for $100 \times 0.5 [= 50]$ **M1** for $98 - 50 [= 48]$ **M1** for $48 \div 0.4 = 120$ [min] = 2 [hr]
(b)	2925 1170 4095	3	**B2** for one correct answer or **M1** for 8190 ÷ (5 + 2 + 7)
(c)	58	2	**M1** for $\left(1+\frac{45}{100}\right)k = 84.1$ oe

26. 0580_s21_ms_41 Q: 4

	Answer	Mark	Partial Marks
(a)(i)	438 cao	2	**M1** for $\frac{500}{1.142}$
(a)(ii)	14.95	2	**M1** for [329 –] 275×1.142 oe
(b)	14	2	**M1** for $5.25 \times \frac{8}{3}$ oe
(c)	1.7[0] or 1.699…	3	**M2** for $\sqrt[5]{\frac{6669}{6130}}$ or **M1** for $6669 = 6130\ (k)^5$

27. 0580_s21_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	11.61 final answer	2	**M1** for $13.5[0] \times \left(1 - \frac{14}{100}\right)$ oe or **B1** for 1.89
(a)(ii)	197.37 final answer	2	**FT** 17 × *their* (a)(i) exact or correct to nearest cent **M1** for 42.5 ÷ 2.5
(b)(i)	53.3 or 53.33…	1	
(b)(ii)	7.5	2	**M1** for 22.5 ÷ (2 + 8 + 5) oe soi
(c)	20.55×2.45 oe	M2	**M1** for 20.5 + 0.05 oe seen or 2.4 + 0.05 oe seen If 0 scored, **SC1** here for 20.45×2.35 oe
	3 nfww	A2	**M1** for *their* area ÷ 10 ÷ 2.5 oe

28. 0580_s21_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	120	**2**	**M1** for $6 \div (21 - 19)$ oe soi or for $\frac{2x}{40} = 6$
(a)(ii)(a)	34	**2**	**M1** for $40 - \frac{15}{100} \times 40$ oe or better or **B1** for 6
(a)(ii)(b)	35	**2**	**M1** for $\left(1 - \frac{15}{100}\right) \times p = 29.75$ or better
(b)(i)	44 274 cao	**3**	**B2** for 44273 to 44274 or 44270 or **M1** for $40100 \times \left(1 + \frac{2}{100}\right)^5$ oe
(b)(ii)	2019 nfww	**3**	**M2** for one correct trial of $n = 8$ or $n = 9$ either to find a salary or, if working with 1.02^n and 47 500 ÷ 40 100 [= 1.1845], to find a value of 1.02^n or **B2** for final answer 9 or 4 nfww or **M1** for *their* 44 274 $\times \left(1 + \frac{2}{100}\right)^n = 47\,500$ oe or 40 100 $\times \left(1 + \frac{2}{100}\right)^n = 47\,500$ oe or for at least one trial giving a value greater than *their* 44 274
(c)	2.9 [increase]	**2**	**M1** for $\left(1 + \frac{5}{100}\right) \times \left(1 - \frac{2}{100}\right)$ oe implied by 1.029 or 102.9[%]

29. 0580_m20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	295	2	**M1** for [87 +] 4×52 oe
(a)(ii)	29.5 or 29.49…	1	**FT** $\frac{87}{their\textbf{(a)(i)}} \times 100$
(b)	11	2	**M1** for 18×4 [± 61] oe
(c)	4160 cao nfww	2	**M1** for $64 \div 0.0154$ or **B1** for rounding *their* answer to nearest 10
(d)	2.4[0] nfww	2	**M1** for $\left(1+\frac{12.5}{100}\right)x = 2.7[0]$ oe
(e)	53 : 36	3	**M2** for 265 : 180 oe or for answer 36 : 53 or 53 min: 36 min or **M1** for 4h 25 [mins] or 265 [mins] seen
(f)	6[.00] or 5.999…	3	**M2** for $\sqrt[5]{\frac{736}{550}}$ or **M1** for $736 = 550 \times (x)^5$

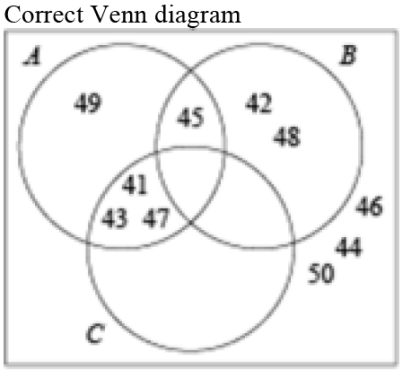
30. 0580_p20_ms_40 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	48	2	**M1** for $\frac{72}{3}$
(a)(ii)	32.4[0]	1	
(a)(iii)	$\frac{13}{30}$	2	**M1** for $\frac{72 - their\textbf{ (ii)} - 8.4}{72}$ oe
(a)(iv)	24	3	**M2** for $\frac{19.2}{0.8}$ oe or **M1** for recognising 19.2 is 80%
(b)	660	3	**M2** for $\frac{550 \times 2 \times 10}{100} + 550$ oe or **M1** for $\frac{550 \times 2 \times 10}{100}$ oe
(c)	663.9[0]	2	**M1** for 550×1.019^{10} oe
(d)	1.5[0]	3	**M2** for $\sqrt[10]{\frac{638.3[0]}{550}}$ oe or **M1** for $550 \times m^{10} = 638.3[0]$

31. 0580_s20_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	7680	**2**	**M1** for $0.24 \times 32\,000$ oe
(a)(ii)	34 240	**2**	**M1** for $32\,000 \times \frac{100+7}{100}$ oe
(b)	5306.04	**2**	**M1** for $5000 \times \left(1+\frac{2}{100}\right)^3$ oe
(c)	26.7 or 26.66... to 26.67	**4**	**B3** for 96 or $\frac{96}{360}$ oe OR **M3** for $(1-\frac{1}{5}) \times (1-\frac{2}{3}) \times 100$ oe or **M2** for $(1-\frac{1}{5})$ and $(1-\frac{2}{3})$ oe OR **M1** for $360 \div 5$ [$\times 4$] oe **M1** for *their* $288 \div 3$ [$\times 2$]
(d)	33 500	**2**	**M1** for $36\,515 \div \frac{100+9}{100}$ oe
(e)	6525	**4**	**M3** for $\left(\frac{65}{45}-\frac{63}{45}\right)[A]=290$ oe or **M2** for $\left(\frac{13}{9}-\frac{7}{5}\right)[A]=290$ oe or **M1** for correct attempt to convert to a common ratio value for Arjun or for $\frac{13}{9}-\frac{7}{5}$ oe

32. 0580_s20_ms_41 Q: 5

	Answer	Mark	Partial Marks
(a)	Correct Venn diagram 	**3**	**B2** for 8 or 9 numbers correct or **B1** for 6 or 7 numbers correct
(b)(i)	41, 43, 47	**1**	**FT** *their* Venn diagram
(b)(ii)	44, 46, 49, 50	**1**	**FT** *their* Venn diagram
(c)	0	**1**	**FT** *their* Venn diagram

33. 0580_s20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	14, 10	**2**	**M1** for $24 \div (7 + 5)$
(a)(ii)	$\frac{3}{350}$	**2**	**B1** for correct fraction not in lowest terms
(a)(iii)	120	**1**	
(b)(i)	10.2[0]	**2**	**M1** for $\frac{15}{100} \times 12$ oe or better
(b)(ii)	45	**2**	**M1** for $\frac{38.25}{1-\frac{15}{100}}$ oe
(c)(i)	85	**2**	**M1** for $\frac{500 \times 1.7 \times 10}{100}$ oe
(c)(ii)	203 or 202.5 to 202.6	**2**	**M1** for $200 \times \left(1+\frac{0.0035}{100}\right)^{365}$
(c)(iii)	1.9	**3**	**M2** for $\sqrt[6]{\frac{559.78}{500}}$ or **M1** for $500\left(1+\frac{r}{100}\right)^{6} = 559.78$

34. 0580_s20_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)	1260	2	**M1** for $15 \times 54 + 25 \times 18$
(b)	38 800	2	**M1** for $37054 \div \left(1 - \frac{4.5}{100}\right)$ oe
(c)(i)	15 : 12 : 28	2	**M1** for correct attempt to find a common multiple for the women oe
(c)(ii)	216	3	**M2** for $224 \div$ *their* $28 \times$ *their* $(15 + 12)$ or **M1** for $224 \div$ *their* 28
(d)	55.25	2	**M1** for $8 + 0.5$ or $6 + 0.5$ seen
(e)	156 or 156.3…	2	**M1** for $\left(1 + \frac{1.5}{100}\right)^{30}$

35. 0580_w20_ms_41 Q: 2

	Answer	Mark	Partial Marks
(a)	1 : 5 : 12	2	**M1** for 2 : 10 : 24 or 7 : 35 : 84 or $\frac{1}{18} : \frac{5}{18} : \frac{12}{18}$
(b)(i)	266 and 95	3	**B2** for 266 or 95 or 266 and 95 reversed or **M1** for $\frac{114}{6}$
(b)(ii)	15	2	**M1** for $\frac{114 - 96.9}{114}$ [$\times 100$] oe or $\frac{96.9}{114} \times 100$
(c)(i)	2h 50min	1	
(c)(ii)	636	2	**M1** for 1802 ÷ *their* 2h 50min

36. 0580_w20_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	9080 cao	**3**	**B2** for 9078 to 9081… or **M1** for 813 × *their* 11h 10min
(b)(i)	654 or 653.5…	**2**	**M1** for 10260 ÷ 15 h 42 min oe
(b)(ii)(a)	21.8 or 21.82 to 21.83	**1**	
(b)(ii)(b)	4.58 or 4.59 cao	**2**	**M1** for 470 ÷ (10260 ÷ 100) oe or 100 ÷ *their* **(b)(ii)(a)**
(c)	12.97	**1**	

37. 0580_w20_ms_42 Q: 3

	Answer	Mark	Partial Marks
(a)(i)	2210 or 2208 or 2208.2, or 2208.16…	**2**	**M1** for $2000 \times \left(1+\frac{2}{100}\right)^5$ oe
(a)(ii)	10.4 or 10.5 or 10.40 to 10.41	**2**	**M1** for $\frac{\textit{their}\,\textbf{(a)(i)} - 2000}{2000}$ [×100] or $\frac{\textit{their}\,\textbf{(a)(i)}}{2000} \times 100$ or $\left(1+\frac{2}{100}\right)^5 - 1$ or $\left(1+\frac{2}{100}\right)^5 \times 100$ oe
(a)(iii)	12	**3**	**B2** for 11.3 or 11.26 to 11.27 **OR** **M2** for [2000 ×] $\left(1+\frac{2}{100}\right)^{11}$ oe or [2000 ×] $\left(1+\frac{2}{100}\right)^{12}$ oe seen or **M1** for [2000 ×] $\left(1+\frac{2}{100}\right)^{n}$ oe, $n > 5$ oe or for $2000 \times \left(1+\frac{2}{100}\right)^{n} = \text{or} > \text{or} \geqslant 2500$ oe

	Answer	Mark	Partial Marks
(b)	490 cao	3	**M2** for $p\times\left(1-\frac{4}{100}\right)^{16}=255$ oe soi by 490.0... or **M1** for $p\times\left(1-\frac{4}{100}\right)^{n}=255$ oe, $n>1$ oe

38. 0580_w20_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	$5.101[00\ldots]\times10^{8}$ final answer	1	
(a)(ii)	361 150 800 oe	2	**FT** *their* **(a)(i)** **M1** for $\frac{70.8}{100}\times510\,100\,000$ or for $\frac{70.8}{100}\times$ *their* **a(i)**
(b)(i)	6070 oe	1	
(b)(ii)	32 000 oe	2	**B1** for figs 32
(b)(iii)	6.68 or 6.677 …	2	**M1** for $\frac{6.41\times10^{5}}{9.6[0]\times10^{6}}$ [$\times100$] oe
(b)(iv)	1250 or 1248 to 1249 oe	2	**B1** for figs 125 or figs1248 to figs 1249
(c)(i)	25.1 or 25.08…	2	**M1** for $\frac{7.53[\times10^{9}]-6.02[\times10^{9}]}{6.02[\times10^{9}]}$ oe or $\frac{7.53[\times10^{9}]}{6.02[\times10^{9}]}\times100$
(c)(ii)	1.33 or 1.325…	3	**M2** for $\sqrt[17]{\frac{7.53[\times10^{9}]}{6.02[\times10^{9}]}}$ or $\sqrt[17]{1+\frac{\textit{their}\ \textbf{(c)(i)}}{100}}$ or **M1** for $6.02[\times10^{9}]\times p^{17}=7.53[\times10^{9}]$ or $p^{17}=1+\frac{\textit{their}\ \textbf{(c)(i)}}{100}$

39. 0580_m19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	473	2	**M1** for $645 \div (11 + 4)$
(b)	212.5	2	**M1** for 50×4.25
(c)	31.5 or 31.45 to 31.46	3	**M2** for $54 \div 1\frac{43}{60}$ oe or **M1** for time =1h 43min or 103 [mins] or $54 \div$ *their* time
(d)	875	1	
(e)	10.4 or 10.38 to 10.39	1	
(f)(i)	30 [×] 70 and 2100	1	
(f)(ii)	both numbers rounded up oe	1	

40. 0580_s19_ms_41 Q: 8

	Answer	Mark	Partial Marks
(a)	6 nfww	3	**M2** for $\frac{2.65 - 2.50}{2.50}$[×100] or for $\frac{2.65}{2.50} \times 100$ or **M1** for $\frac{2.65}{2.50}$
(b)	552.5[0]	3	**B2** for 52.5[0] or **M2** for $500 \times \frac{1.5}{100} \times 7 + 500$ oe or **M1** for $500 \times \frac{1.5}{100}$ [×7] oe
(c)	37.4 or 37.36…	2	**M1** for $\left(1 + \frac{1.6}{100}\right)^{20}$ oe soi 1.37…
(d)	4[.00...]	3	**M2** for $\sqrt[22]{\frac{2607}{6400}}$ or **M1** for $6400 \times x^{22} = 2607$ oe or better

41. 0580_s19_ms_41 Q: 11

	Answer	Mark	Partial Marks
	[Total time =]16 h 6 min or 16.1 h	2	**B1** for 22 h 6 min or 22.1h or 966 mins If 0 scored, **SC1** for 9 h 41 min
	[Distance to airport in New York =] 16.5	2	**M1** for 18×55
	[Arc length =] 6200 or 6199 to 6200. …	3	**M2** for $\frac{55.5}{360} \times 2 \times \pi \times 6400$ or **M1** for $\frac{55.5}{360}$ or $2 \times \pi \times 2400$
	[Distance Geneva to Chamonix =] 104	2	**M1** for 65×1.6 or 65×96 oe
	392 to 393	2	**M1** for $\frac{6316 \text{ to } 6322.4}{\textit{their}16.1}$ Must be correct value in numerator

42. 0580_s19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)	16.5 or 16.49...	3	**M2** for $\frac{1.13 - 0.97}{0.97}[\times 100]$ oe or $\frac{1.13}{0.97} \times 100$ oe or **M1** for $\frac{1.13}{0.97}$ oe
(b)(i)	35	2	**M1** for $60 \div (5 + 7)$
(b)(ii)	140	1	
(c)	$1.26 final answer	3	**B2** for 1.259... or 1.26 but not as final answer or **M1** for $2.25 \div 0.9416$ If 0 scored, **SC1** for 1.13×0.9416
(d)	15[.0…]	3	**M2** for $\sqrt[21]{\frac{58000}{1763000}}$ oe or **M1** for $58000 = 1763000\ (k)^{21}$
(e)	1239.75	2	**B1** for 43 + 0.5 or 28 + 0.5 oe seen

43. 0580_s19_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	6h 27 mins	2	**B1** for answer .....h 27 mins
(a)(ii)	150 km/h	3	**M2** for $\frac{90}{36} \times 60$ or **M1** for $\frac{90}{\textit{their}\ \text{time}}$ or **B1** for 36 [mins] seen
(a)(iii)	780	4	**M3** for $\left(90 \times \frac{35}{3600}\right) \times 1000 - 95$ oe or **M2** for $\left(90 \times \frac{35}{3600}\right) \times 1000$ oe or **B1** for figs 875 or **M1** for $90 \times \frac{35}{3600}$ seen or for $90 \times \frac{1000}{3600}$ oe If 0 scored, **SC1** for *their* distance (> 95) – 95
(b)(i)	7 : 5	1	
(b)(ii)	66.7 or 66.66 to 66.67	3	**M2** for $\frac{140-84}{84}$ [× 100] oe or for $\frac{140}{84} \times 100$ oe or **M1** for $\frac{140}{84}$ oe
(b)(iii)	24 576	5	**M4** for complete method, $40 \times 60 + 0.7 \times 220 \times 84 + 0.3 \times 220 \times 140$ oe OR **B1** for 40 [children] **M1** for $0.7 \times 220 \times 84$ oe **M1** for $0.3 \times 220 \times 140$ oe **B1** for 2400 or 12936 or 9240 nfww

	Answer	Mark	Partial Marks
(c)	3.5×10^5 nfww	3	**M2** for $3.08 \times 10^5 \div \left(\frac{100-12}{100}\right)$ oe or **M1** for 3.08 [$\times 10^5$] associated with (100–12)%

44. 0580_w19_ms_41 Q: 2

	Answer	Mark	Partial Marks
(a)	[Ali] 2700 [Mo] 2100	3	**B2** for one correct or for correct values reversed or **M1** for 600 ÷ (9 – 7) or for any equation that would lead to an answer of 300, 2700 or 2100, or 4800 (for the total)

	Answer	Mark	Partial Marks
(b)	11	3	**M2** for $\frac{220-195.8}{220}[\times 100]$ or for $[100 -]\frac{195.8}{220}\times 100$ or **M1** for 220 – 195.8 or for $\frac{195.8}{220}$ or a correct implicit equation for percentage reduction or for $\frac{195.8-220}{220}$
(c)	84	3	**M2** for $\frac{63}{1-\frac{25}{100}}$ oe or **M1** for associating 63 with (100 – 25)% or a correct implicit equation for the original price.

45. 0580_w19_ms_41 Q: 3

	Answer	Mark	Partial Marks
(a)	662.45	2	**M1** for $600\times\left(1+\frac{2}{100}\right)^5$ oe
(b)(i)	800	2	**M1** for $x\left(1+\frac{5}{100}\right)^2=882$ oe or **SC1** for answer 82
(b)(ii)	5 nfww	2	**M1** for trial with $882\times\left(1+\frac{5}{100}\right)^n$ with $n>1$

46. 0580_w19_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	5 : 6	**1**	
(a)(ii)	2.0736[0] × 10^5 final answer	**3**	**B2** for 207360 oe or **M1** for 16 × 18 × 720
(b)(i)	26780	**2**	**M1** for 18540 ÷ 9 soi
(b)(ii)	1.36	**2**	**M1** for 0.85 × 1.6 oe or **B1** for 0.51 or 51
(c)	66.7 or 66.66 to 66.67	**5**	**M4** for $\frac{(2.3-1.5\times0.92)}{1.5\times0.92}[\times100]$ oe or $\frac{2.3\times100}{1.5\times0.92}$ oe **OR** **Working in euros** **B2** for [€]1.38 or **M1** for 1.5[0] × 0.92 **M2dep on B2 or M1** for $\frac{2.3-their\ 1.38}{their\ 1.38}[\times100]$ oe or $\frac{2.3-their\ 1.38}{their\ 1.38}\times100$ oe or **M1** for 2.3 – *their* 1.38 or $\frac{2.3}{their\ 1.38}$ **OR** **Working in dollars** **B2** for [$]2.50 or **M1** for or 2.3[0] ÷ 0.92 **M2dep on B2 or M1** for $\frac{their\ 2.5-1.5}{1.5}[\times100]$ oe or $\frac{their\ 2.5}{1.5}\times100$ or **M1** for *their* 2.5 – 1.5 or $\frac{their\ 2.5}{1.5}$

	Answer	Mark	Partial Marks
(d)	219 000 or 218814[.3….] rounded to 4 sf or more	**3**	**B2** for 414000 or 414414[.3….] rounded to 4 sf or more or **M2** for $195600\times\left(1+\frac{8.7}{100}\right)^9$ [– 195600] or **M1** for $195600\times\left(1+\frac{8.7}{100}\right)^k$ or better ($k>1$ and an integer)

47. 0580_w19_ms_42 Q: 9

	Answer	Mark	Partial Marks
(a)	171 or 171.0…	**3**	**M2** for $\frac{7.6}{160} \times 60 \times 60$ oe or **M1** for $\frac{7.6}{160}$ or $\frac{7.6}{2\frac{2}{3}}$ or $\frac{7.6}{2\,\text{min}\,40\,\text{sec}}$ If 0 scored, **SC1** for answer 189 or 188.6 to 188.7
(b)(i)	77 [min] 20 [s]	**4**	**M3** for $\frac{32}{12} \times 29$ oe or **B2** for 4640 or 1.29 or 1.288 to 1.289, $\frac{58}{45}$ oe or 32 laps or 29 laps or **M2** for $2^5 \times 5 \times 29$ oe or **M1** for 2 m 40 sec ÷ (2 m 40 sec – 2 m 25 sec) soi for 2 m 25 sec ÷ (2 m 40 sec – 2 m 25 sec) soi or for an attempt to find LCM or 23 200 seen or correctly find prime factors of 145 or 160 or for $\frac{7.6}{145}$ or $\frac{7.6}{2\frac{5}{12}}$ or $\frac{7.6}{2\,\text{min}\,25\,\text{sec}}$ oe, provided SC1 not earned in part (a)
(b)(ii)	220.4	**2**	**M1** for *their* (b)(i) ÷ 2min 40 sec [× 7.6] oe or *their* (a) × *their* (b)(i) ÷ 60 oe

48. 0580_w19_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	1254	2	**M1** for 342 ÷ 3
(a)(ii)	27.3 or 27.27…	1	
(b)	867	2	**M1** for $1020\times\frac{15}{100}$ oe or $1020\times\left(1-\frac{15}{100}\right)$ oe
(c)	4.5[0]	3	**M2** for $\frac{79.5[0]}{100+6}[\times 6]$ oe or $\frac{79.5[0]}{100+6}\times 100$ oe or **M1** for 79.5[0] associated with 106[%]
(d)	22.6 or 22.58… nfww	4	**M1** for $\frac{45}{20}$ or better and **M2** for $\frac{60+45}{\textit{their}\ 2\text{h}\ 24\text{min}+\textit{their}\ \frac{45}{20}}$ or **M1** for $\textit{their}\ \frac{45}{20}+\textit{their}$ 2h 24min
(e)	91.6[0] to 91.61	3	**M2** for $480\times\left(1+\frac{2.1}{100}\right)^4-430$ oe OR **M1** for $480\times\left(1+\frac{2.1}{100}\right)^4$ oe **A1** for 522, 521.6[0] to 521.61
(f)	112.8125	2	**B1** for 2.5 or 9.5 seen

49. 0580_m18_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	23.27 final answer	2	**M1** for 9 × 2.97 soi
(a)(ii)	2.75 final answer	3	**M2** for $2.97\div\frac{108}{100}$ oe or **M1** for 108[%] associated with 2.97 oe
(b)	12.4[0] or 12.41 to 12.42	2	**M1** for 35 ÷ 0.0153 oe If 0 scored, **SC1** for answer 0.19
(c)	70 nfww	3	**M2** for (600 + 2.5) ÷ (9 – 0.5) or **B1** for one of 600 + 2.5 or 9 – 0.5 seen

50. 0580_s18_ms_41 Q: 1

	Answer	Mark	Partial Marks
(a)	$\frac{9}{9+7+4}\times 680$	1	
(b)	238 136	3	**B2** for 238 or 136 or **M1** for $\frac{7}{9+7+4}\times 680$ oe or $\frac{4}{9+7+4}\times 680$ oe seen
(c)	272	2	**M1** for $306 \div 1.125$
(d)	1.37	3	**M2** for $(17.56-5\times 2.69)\div 3$ or **M1** for $17.56-5\times 2.69$ or **B1** for 13.45 [cost of apples]
(e)	40.8[0]	3	**3FT** for 0.3 × *their* 136 from part **(b)** or **M2** for *their* $136(\frac{1}{2}+\frac{1}{5})$ or better or **M1** for *their* $136\times\frac{1}{2}$ or *their* $136\times\frac{1}{5}$ or **B1** for 68 or 27.2 or $\frac{3}{10}$ or 0.3 seen

51. 0580_s18_ms_41 Q: 3

	Answer	Mark	Partial Marks
(a)	6.06 or 6.060 to 6.061	3	**M2** for $\frac{82500-77500}{82500}$[×100] oe or **M1** for $\frac{77500}{82500}$[×100] soi
(b)	13 674 cao	3	**M1** for $12000\left(1+\frac{2.2}{100}\right)^6$ **A1** for 13673.7...

52. 0580_s18_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	85	**1**	
(a)(ii)	455	**2**	**M1** for $260 \div 20 \times 35$ oe
(a)(iii)	61	**3**	**B2** for 61.5… seen or **M1** for $2000 \div 650$ soi or for $\frac{x}{2000} = \frac{20}{650}$ oe or other attempt at scaling up with 650 or for $650 \div 20$ oe
(b)(i)	40	**3**	**M2** for $\frac{1.89 - 1.35}{1.35}$ [$\times 100$] oe or $\frac{1.89}{1.35} \times 100$ oe or **M1** for oe $\frac{1.89}{1.35}$[$\times 100$] soi
(b)(ii)	1.75 nfww	**3**	**M2** for $1.89 \div \left(\frac{100+8}{100}\right)$ or better or **M1** for 1.89 associated with 108 [%]
(c)	10.1 or 10.06…	**3**	**M2** for $\sqrt[3]{\frac{20.8}{15.6}}$ oe or **M1** for $15.6 \times k^3 = 20.8$ oe
(d)(i)	14:15	**3**	**B2** for correct unsimplified 3 term ratio A: B: C or correct unsimplified two term ratio A : C or **M1** for attempt to find common multiple of 4 and 10 or other common value for B or for $7 \times \frac{4}{10}$ oe or $3 \times \frac{10}{4}$ oe

	Answer	Mark	Partial Marks
(d)(ii)	147	**3**	**M2** for $\frac{45}{15}(14 + 20$ [+15]$)$ oe or $45 \div 3 \times 4 + (45 \div 3 \times 4) \div 10 \times 7$ [+ 45] or **M1** for $45 \div 3$ oe or $45 \div$ *their* **(d)(i)** value for C shown

53. 0580_s18_ms_43 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	13.5	3	**M2** for $\frac{45.4[0]-40}{40}$ [$\times 100$] or $\frac{45.4[0]}{40} \times 100$ or **M1** for $\frac{45.4[0]}{40}$ [$\times 100$]
(a)(ii)	35.5[0]	3	**M2** for $42.6[0] \div \left(1+\frac{20}{100}\right)$ or better or **M1** for recognising 42.6[0] as 120[%]
(b)	150 cao	2	**M1** for $\frac{500\times 2\times 15}{100}$ oe
(c)(i)	7800 cao	3	**B2** for 7790 or 7785 to 7786 or **M1** for $21000\times\left(1-\frac{18}{100}\right)^5$ oe isw If 0 or 1 scored, **SC1** for *their* 7785… seen and rounded correctly to nearest 100
(c)(ii)	9[.00…]	3	**M2** for $\sqrt[12]{\frac{42190}{15000}}$ or better or **M1** for $15000\left(1+\frac{x}{100}\right)^{12}=$[42190]

54. 0580_w18_ms_42 Q: 1

	Answer	Mark	Partial Marks
(a)(i)	1200	2	**M1** for 1962 ÷ 1.635
(a)(ii)	1667.7[0] final answer	2	**M1** for $1962 \times (1 - \frac{15}{100})$ oe or **B1** for 294.3[0] If 0 scored, **SC1** for answer 1020
(a)(iii)	275	2	**M1** for 220 ÷ *their* (5 – 1) soi
b(i)	165	3	**M2** for $\frac{9752-3680}{3680}$[$\times 100$] oe or $\frac{9752}{3680}\times 100$ oe or **M1** for $\frac{9752}{3680}$ or 9752 – 3680
b(ii)	51200	3	**M2** for $\frac{74240}{100+45}$[$\times 100$] oe or **M1** for 74 240 associated with 145[%] oe

55. 0580_w18_ms_43 Q: 2

	Answer	Mark	Partial Marks
(a)(i)	$\frac{240}{(23+25)} \times 23$	**M1**	
(a)(ii)	11 : 10	**2**	**M1** for 110 : 100 or better or **SC1** for 10 : 11, following boys 100, girls 110

	Answer	Mark	Partial Marks
(a)(iii)	276	**2**	**M1** for $240 \times \left(1+\frac{15}{100}\right)$ oe or **B1** for 36 seen
(a)(iv)	150	**3**	**M2** for $\frac{240}{100+60}$ [× 100] oe or **M1** for evidence of 160[%] associated 240
(b)	464 000	**3**	**M1** for $256\,000 \times \left(1+\frac{2}{100}\right)^{30}$ oe **A1** for 463 700 to 463 710 **B1** for *their* more accurate answer seen and rounded to nearest 1000
(c)	4.5[0]	**3**	**M2** for [x =] $\sqrt[32]{4.09}$ oe or **M1** for $(x)^{32} = 4.09$ oe If 0 scored, **SC2** for answer 3.6 or 3.59 or 3.588… or **SC1** for $\sqrt[32]{3.09}$ or 1.0358 to 1.036 seen

56. 0580_m17_ms_42 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)	22.9 or 22.85 to 22.86	**2**	**M1** for $\frac{8}{10+17+8}$ [× 100] oe
(b)	$5635\times\frac{17}{10+17+8}$ or better [= 2737]	**2**	**M1** for $\frac{5635}{(10+17+8)}$
(c)	5000	**3**	**M2** for $5635=k\left(1+\frac{2.42}{100}\right)^5$ oe or **B1** for $\left(1+\frac{2.42}{100}\right)$
(d)	9950	**2**	**M1** for 2 × 2500 or 3 × 1650
(e)	1.98 final answer	**2**	**B1** for 1.976 or 1.98 not final answer or **M1** for 130 × 0.0152

57. 0580_s17_ms_41 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	275.31	**2**	**M1** for 90 × 23.15 + 1885 × 13.5 oe
(a)(ii)	3202	**3**	**M2** for $\frac{198.16-90\times0.245}{0.055}$ oe **M1** for 90 × 0.245 or 90 × 24.5 oe
(b)	17.[0] or 17.00 to 17.01	**2**	**M1** for $13.5\times\left(1+\frac{8}{100}\right)^3$
(c)(i)	40	**3**	**M2** for $\frac{7.7-5.5}{5.5}$ [×100] oe or $\frac{7.7}{5.5}\times100$ or **M1** for $\frac{7.7}{5.5}$ oe
(c)(ii)	11.9 or 11.86 to 11.87	**3**	**M2** for $\sqrt[3]{\frac{7.7}{5.5}}$ oe or **M1** for $5.5\times x^3=7.7$ oe
(d)	150 [million] oe	**2**	**M1** for 390 [million] ÷ (5 + 2 + 6)
(e)	250 nfww	**3**	**M2** for 258.25 ÷ ((100 + 3.3) ÷ 100) or **M1** for 258.25 associated with 103.3[%]

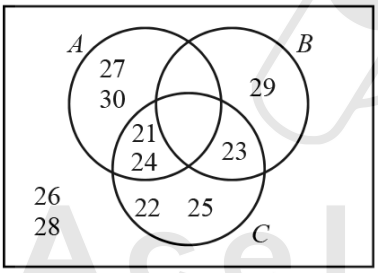
58. 0580_s17_ms_42 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	600 ÷ (11+ 9) × 11 [=330] with no errors seen	**M1**	Could be in separate steps
(a)(ii)	270	**1**	
(b)(i)	372 cao nfww	**3**	**B2** for answer 371.7… or **M1** for $330 \times \left(1+\frac{1.5}{100}\right)^{8}$ oe not spoiled After zero scored, **SC1** for answer 42 or 41.7…
(b)(ii)	12.6 or 12.7 or 12.63 to 12.73	**2**	**M1** for $\frac{\textit{their}\,\textbf{(b)(i)}-330}{330}$ or $\frac{\textit{their}\,\textbf{(b)(i)}}{330}\times 100$ soi by 112.7 or 113 After zero scored, **SC1** for answer 12%
(c)(i)	$\frac{99}{280}$ cao final answer	**1**	
(c)(ii)	27.5[0]	**3**	**M2** for $24.75 \div \frac{100-10}{100}$ oe or **M1** for recognising 24.75 as 90[%] oe
(d)(i)	32 cao	**2**	**M1** for $\left(1-\frac{20}{100}\right)\left(1-\frac{15}{100}\right)$ [x]oe or for 0.15 × 0.8 [x] oe
(d)(ii)	13 cao	**2**	**M1** for $\left(1-\frac{20}{100}\right)\left(1-\frac{15}{100}\right)\times x = 40.84 - 32$ oe seen or for *their* **(d)(i)** + $\left(1-\left(\frac{\textit{their}\,\textbf{(d)(i)}}{100}\right)\right)x = 40.84$ oe

59. 0580_s17_ms_43 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	9550	**1**	
(a)(ii)	23 158 750	**2FT**	**FT** *their* **(a)(i)** × 2425 correctly evaluated **M1** for *their* lower bound × 2425
(a)(iii)	23 160 000	**1FT**	**FT** *their* **(a)(ii)** rounded to 4 sf
(a)(iv)	2.316×10^7	**1FT**	**FT** *their* **(a)(iii)** or *their* **(a)(ii)** rounded to 3sf or more and in standard form
(b)	520 nfww	**3**	**M2** for $546 \times \frac{100}{(100+5)}$ oe or **M1** for 105[%] associated with 546 oe
(c)	3380 or 3376 to 3377	**2**	**M1** for $3\,000 \times \left(1+\frac{3}{100}\right)^4$ oe

60. 0580_s17_ms_43 Q: 10

	ANSWER	MARK	PARTIAL MARKS
(a)		**4**	All 8 regions correct **M3** for 6 or 7 regions correct **M2** for 4 or 5 regions correct **M1** for 3 regions correct
(b)(i)	$\notin$	**1**	
(b)(ii)	$\varnothing$	**1**	
(c)	21, 23, 24, 29	**2FT**	Correct or **FT** **SC1** for 1 omission or 4 correct and 1 extra
(d)(i)	5	**1FT**	Correct or **FT** if less than 10
(d)(ii)	9	**1FT**	Correct or **FT** if less than 10
(e)	$\subset$ or $\subseteq$	**1**	

61. 0580_w17_ms_41 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)	2915	**2**	**M1** for 10 494 ÷ (13 + 5) oe
(b)	1056	**2**	**M1** for 384 ÷ (10 – 6) oe
(c)(i)	52.2 or 52.17…	**2**	**M1** for 20 ÷ 23 or 20 × 60 or 23 ÷ 60 isw If zero scored, **SC1** for answer 52.6 (from use of 0.38)
(c)(ii)	63[.0] or 63.03 to 63.05…	**5**	**M4** for $\frac{\textit{their}\ 52.17... - 32}{32} \times 100$ oe or **M3** for $\frac{\textit{their}\ 52.17... - 32}{32}$ oe or $\frac{\textit{their}\ 52.17...}{32} \times 100$ oe OR **B2** for $\frac{5}{8}$ [hours] oe or 37.5 [minutes] or **M1** for 20 ÷ 32 or better and **M2** for $\frac{\textit{their}\ 37.5 - 23}{23} \times 100$ oe or **M1** for $\frac{\textit{their}\ 37.5 - 23}{23}$ or $\frac{\textit{their}\ 37.5}{23} \times 100$
(d)	0.06 final answer nfww	**3**	**M1** for 11.99 ÷ 0.9276 or 12.99 × 0.9276 **A1** for 12.93 or 12.925 to 12.926
(e)	9750	**3**	**M2** for $7605 \div \left(1 - \frac{22}{100}\right)$ oe or **M1** for (100 – 22)[%] correctly associated with 7605 seen

62. 0580_w17_ms_42 Q: 1

	ANSWER	MARK	PARTIAL MARKS
(a)(i)	4 : 5	**1**	
(a)(ii)	4 : 5	**1**	
(a)(iii)	3 : 4	**2**	**B1** for 12 : 16 or answer 4 : 3
(b)(i)	26.8 or 26.79…	**3**	**M2** for $\frac{15600-11420}{15600}[\times 100]$ or $\frac{11420}{15600}\times 100$ or **M1** for $\frac{11420}{15600}$
(b)(ii)	16000 nfww	**3**	**M2** for $15600\times\frac{100}{100-2.5}$ oe or **M1** for 15600 associated with 97.5[%] seen
(c)	1.6 or $\frac{8}{5}$	**2**	**M1** for $\frac{200\times x\times 15}{100}=48$ oe or **M1** for figs 16
(d)	2.5 or $\frac{5}{2}$ cao nfww	**3**	**B2** for 2.49[9…] or 102.4[99…] or 1.024[99…] or 2.50 or 102.5 or 1.025 or **M2** for $\sqrt[10]{\frac{256}{200}}$ oe or **M1** for $256=200(x)^{10}$ seen